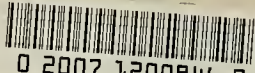


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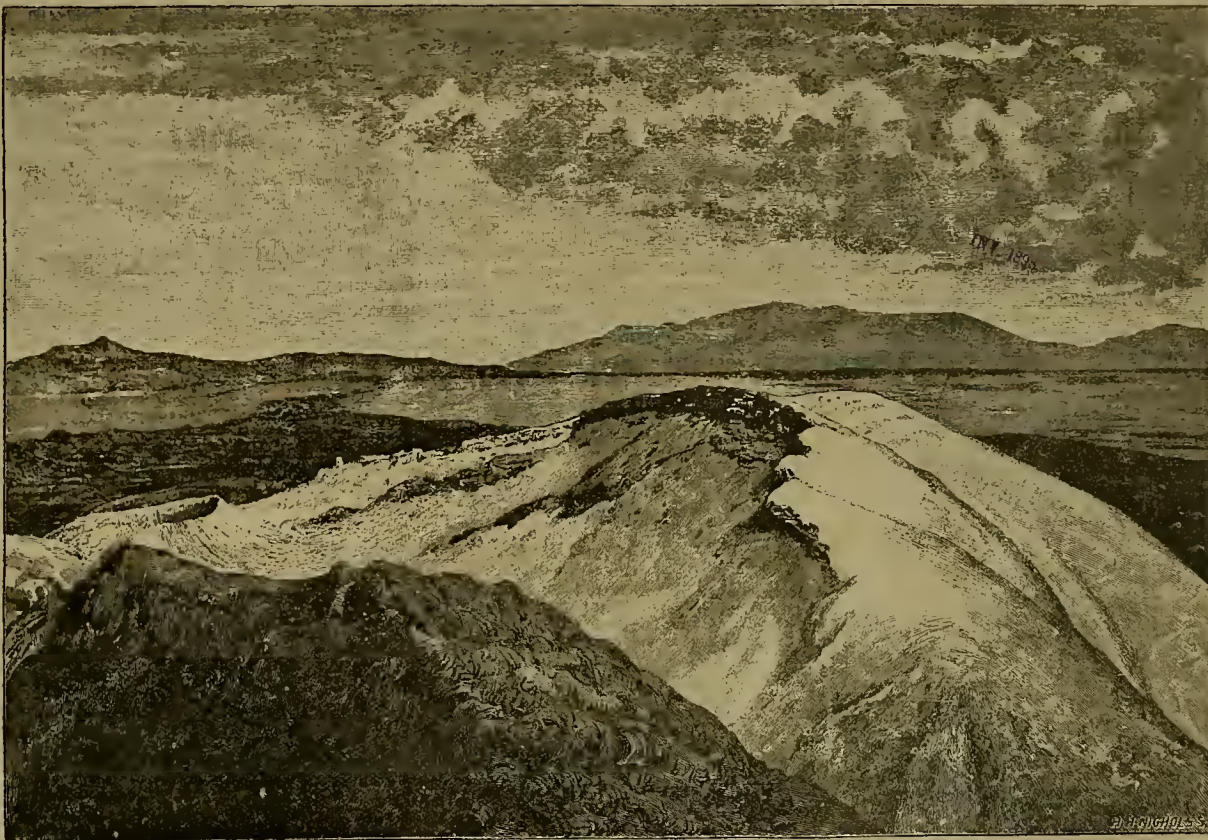
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Ice Spring Craters.

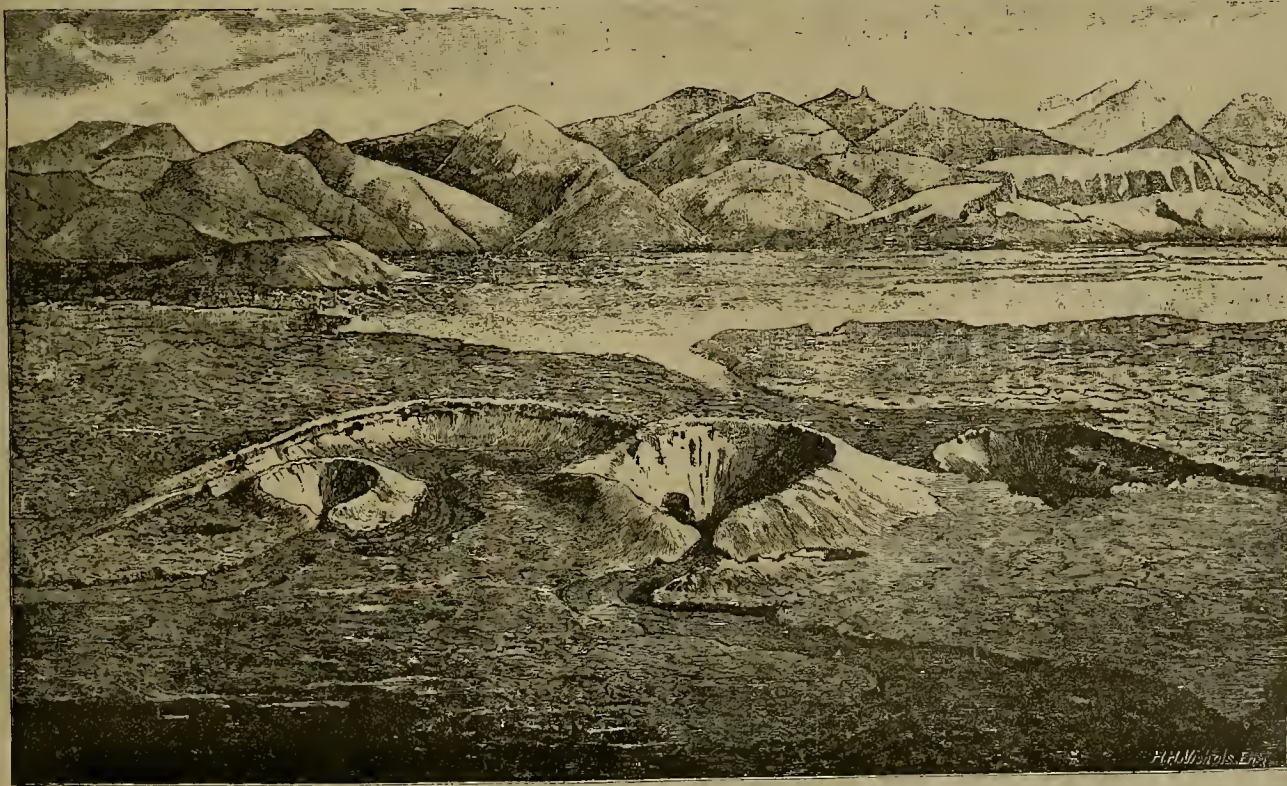
The historic Lake Bonneville, which was the largest of the lakes of the Great Basin, was fed chiefly by the snows of the Wasatch and Uintah mountains. Its catchment basin embraced about five degrees of latitude and three of longitude, containing about 54,000 square miles, or the fourth part of the area of the Great Basin. This region of Utah has been made a subject of special study of late years by the U. S. Geological Survey, and many facts of great scientific interest have been developed.

Of the various volcanic districts of Utah, that which is the most interesting in this connection occupies the eastern portion of the Sevier Desert in the vicinity of the towns of Holden, Fillmore, Corn Creek, Kemosh and Deseret. Nearest to Fillmore is the Ice Spring lava field, with its cluster of craters. The lavas of this locality are the most recent within the Bonneville area, and their phenomena are typical of sub-aerial eruptions. The craters are grouped closely together. There have been at least twelve successive eruptions through as many independent vents within a radius of 1500 feet, and none of these eruptions appears to have been large.

One of the largest of the Scoria hills is the Crescent, shown in the accompanying engravings. It is a crater fragment showing nearly one-half of the original circle. It rises 250 feet above the eastern base, and the entire crater appears to have had a diameter of 2200 feet. One end of the Crescent is buried



ICE SPRING CRATERS; THE CRESCENT AS SEEN FROM THE MITER.



CRESCENT.

MITER.

TERRACE.

ICE SPRING CRATERS; BIRD'S-EYE VIEW FROM THE WEST.

beneath a lava crater, the Miter. The other is cut off by a stream of lava flowing from the same.

The Miter, also shown in the engraving, is perhaps the most recent of the craters. Its rim is nearly circular, with a diameter of 950 feet. Its highest side, on the east, rises 275 feet above the central depression. Its history has involved at least two overflows. After it had reached about its present size, the lava rose within it, breached its north side, and discharged.

The discharge was followed by explosive eruptions and the breach was repaired.

Between the Miter and the Crescent, stands a low cone resembling the Miter in form, but only 400 feet in diameter.

The Terrace crater lies just south of the Miter, with an irregular outline and an extreme length of 1100 feet; width, 700 feet. The depth of the crater below its general rim is 260 feet.

The name of the Ice Spring lava beds is derived from what may be regarded as a natural ice-house, existing in one of the deeper hollows of the fields. It is in a natural pit among the lava blocks, and so sheltered by an overhanging ledge that it never receives the direct rays of the sun.

San Bernardino County.

Its Mineral and Other Resources.

NUMBER XXIV.

[Written for the Press by JAMES H. CROSSMAN.]

Providence Mining District.

Situated on Providence Mountain, has been subdivided, and is now known respectively as the Trojan, the Gold Belt and the Arrow Mining Districts.

Providence Mountain has been previously described in article No. 5 of this series. That portion of the range known as Providence Mountain contains a longitudinal extent of about 20 miles, and is composed of many varieties of rock. The hanging-wall of the mineral belt which courses N. 25 degrees east, through the easterly flanks of the main range, is a porphyritic granite. This mineralized belt is traceable for a distance of more than four miles, and contains 17 full locations of mining claims, with 12 others that are not on the belt proper, according to the District Recorder's book of records.

The Trojan District

Is the most important of the three. The Bonanza King's Mill & Mining Company's property consists of the Bonanza King, Bonanza King North, Orient and the Rattler. Its history in brief is as follows: In 1880 two prospectors from Ivanpah discovered the Bonanza King, and sold it to the noted mine operators and capitalists, Messrs. Osborne and Drew, who reopened the mine, proved its value, and in 1882 resold it to San Francisco and New York capitalists for the sum of \$200,000. Systematic work of development was commenced and a 10-stamp mill erected. From date of purchase to date of suspension in 1886, on account of the burning of the mill, the mine was in bonanza, having paid in dividends a sum in excess of \$200,000. Notwithstanding the large amount of ore in sight in the mine at that date, the owners decided, on account of the low price of silver then ruling, not to rebuild the mill, and their mine has lain idle since.

The developments in the Bonanza King proper consist of a main working shaft, 650 feet deep (vertical), with a network of drifts and crosscuts exposing large bodies of high-grade ore. The Orient and the Bonanza King North adjoin and have been developed and worked through the Bonanza King's main shaft. The buildings and surface improvements are on the Orient ground.

The old Cashier lies on the southerly extremity of the belt referred to. It is a well-defined vein showing spots of silver copper glance that assays from 100 to 400 ounces per ton. It is developed by two small shafts; the owner is L. Walcott.

The Trojan Mine

Contains surface deposits of low-grade ore in the form of segregated pockets or bunches varying from 1 to 50 tons each; ore values in silver, 40 ounces per ton. Notwithstanding the low grade of the ore and low price of silver, this mine has been profitably worked to a considerable extent. The owners are Turner & Dwyre.

The Mineral Point Mine

Has been developed by two levels which have each been extended into the mountain for a distance of 300 feet. The ore extracted has been assorted by hand picking and the better class shipped to Kingman and Ivanpah for sale and reduction. Ore values are from 150 to 500 ounces silver per ton. The second class is worth from 40 to 50 ounces per ton, which still remains on the dump; owners, J. B. Cook and others.

The Mozart

Has been developed by two short tunnels and two shafts, 50 and 90 feet respectively. The ore that has been stopped from the mine has been shipped to Kingman and yielded 150 ounces silver per ton. The owners are J. B. Cook and others.

The Luknow has been developed by an adit level 200 feet long, driven across the country rock into the lode; ore values 40 ounces per ton; the mine is owned by J. B. Cook and others.

The Red Leg has a shaft 40 feet deep on a 20-inch vein; assays run from 15 to 300 ounces per ton; owners, Gorman & Dwyre.

The Bell McGilvray mine is developed by a shaft 75 feet deep and one of 50 feet; also two tunnels respectively 150 and 300 feet in length. Of the ore extracted, 100 tons milled yielded 125 ounces silver per ton; 200 tons on the dump assay 60 ounces silver per ton. The owners are Gorman & Dwyre.

The Bonanza Prince and Bonanza Queen are adjoining claims—test shipments of average ore yielded 80 ounces silver per ton; owner, C. C. Quinn.

The Pitman mine has been developed by a 75-foot vertical shaft, sunk in the country to strike an inclined lode at a depth of 500 feet; crosscuts and levels are to be run each 100 feet. The vein on the surface shows a width of four feet of 75-ounce ore; owners, E. Hahn and others.

The Perseverance Company's property consists of the Perseverance mine, the Buster and Perseverance North. On the Perseverance the main working shaft has reached a vertical depth of 250 feet. The vein in the bottom is four feet wide. It is the intention of the owners to thoroughly develop the mine before mil-

ing any ore. A five stamp mill has been erected on the property, which is owned in Pennsylvania.

The General Custer is a gold mine developed by a shaft 30 feet deep. The grade of ore is \$20 per ton and the claim is owned by C. C. Quinn. The remaining locations on the belt have been but little developed and only enough work has been done to keep up the yearly assessments to hold the claim.

The Gold Belt Mining District, Segregated from the Providence district, is on the northerly flank of Providence mountain. The gold bearing rock lies in streaks, pockets and bands inclosed in a calcareous belt which forms the gangue of the vein. These mines have been but little developed—not enough to prove their extent or value.

The district was formed in 1886 and detached from the Providence on the discovery of its gold-bearing character by Messrs. Wett and Seidel. Of the many locations in this new district, the following are the best developed and the most prominent:

The Toughnut

Has been developed by two shafts, each 60 feet deep, from which considerable ore has been extracted and shipped for reduction, after having been hand-picked and assorted to values ranging from \$150 to \$200 per ton. The second-class ore that remains in sight in the mine and on the dump ranges in values from \$60 to \$80 per ton in gold. This appears to be about the average value of the ores in the mine, with rich pockets and bunches. The property is owned by Messrs. Wett & Domingo.

The Toughnut extension shows some good ore in the croppings, with but little work of development.

The Greyhound

Is situated on the dividing ridge, but included in the Gold Belt District. The product is silver, with values of 50 ounces per ton. It is developed by two tunnels of 100 feet each. The ore occurs in irregular streaks and bunches. The mine is owned by Wett & Domingo.

The Salazar mine is in the vicinity of the Toughnut. The vein is small and carries ore of both gold and silver. Selections have paid in mill \$100 per ton. The mine is owned by Salazar and Cordova. The Madison mine, in the same locality, has not been sufficiently developed to prove its value.

There occur in this district quite a number of springs of considerable strength, which are known as the Summit, Nos. 1, 2 and 3; the Cornfield, the Small Spring, and the Vorhago.

Arrow District

Forms the third subdivision of the old Providence District. It covers the entire southerly portion of the Providence Mountain range from east to west, and from north to south that portion that lies between the Vorhago pass on the north to the Granite pass on the south, embracing a considerable extent of country. This district was formed in 1878. Gold is the predominating metal.

The mine first located is known as the Domingo. It has been worked in a desultory manner by Mexicans to a depth of 40 feet. Arastras have been used for reducing the ore and extracting the metallic product. At that depth the ore became base and unfit for the arastra, and work was discontinued.

Other Prospects.

La Prieta was discovered in 1885. This mine has been developed by a number of small shafts, the deepest being 50 feet; vein 12 inches; ore assorted to values of \$135 and shipped to reduction works. The owner is J. N. Domingo.

The Golden Queen has a shaft 60 feet deep; adit 40 feet; vein 10 inches; ore values \$90 per ton. Joyce & Kean are the owners.

The Hidden Hill mine has but little work of developments. The owner is P. N. Kean.

The Tip Top is developed by pits 40 feet in length and open cuts carrying 12 feet of backs. The ore from this mine has been packed nine miles to water and worked in arastras, yielding an average of \$50 per ton. The owner is Richard Gorman.

The Red Cloud has a vein from two to three feet thick. The ores range in value from \$8 to \$20 per ton. Owner, P. N. Kean.

The Pass mine is a small vein running from \$8 to \$50 per ton in gold. Owner, Richard Gorman.

Northerly and westerly from our standpoint, an extensive elevated mountain range is seen, its lava-capped summit forming a table-land apparently without a break as far as the eye can reach. Easterly, a broad and extensive valley lies at our feet, through which passes the Atlantic & Pacific railroad. The valley shows every evidence of intense volcanic activity at no remote period, geologically speaking. Mud cones of greater or less dimensions dot the plain. We descend into the valley easterly and at a distance of 20 miles reach Fenner Station on the A. & P. R. R., where we are hospitably entertained by Messrs. D. O. Earle & Co. and genial "Bob" Hunter.

(To be Continued)

It is announced that the first of Pennington's air ships, built for the Mount Carmel Aeronautic Navigation Company, will start about January 1st from Mount Carmel for New York, via Chicago and St. Louis. Possibly the date may be postponed to April 1st, owing to circumstances beyond control, and which no gift of prescience could have foreseen.

Development of the South.

It is, of course, true that the South is developing in an industrial way very rapidly, probably more rapidly just at present than any other section of the country; but we believe that some allowance must be made for the published accounts of new enterprises coming from that quarter. The *Manufacturers' Record*, of Baltimore, which confines its operations almost entirely to the South, gives far more attention to the collection of information regarding the formation of new manufacturing enterprises than any other paper we know of, being, in fact, devoted mainly to this work. It has correspondents at all points through the South, who send in accounts of new enterprises, and it is evident that these correspondents do not assure themselves in every instance that a proposed factory or other enterprise is to be a bona fide thing, but simply send in an account of everything talked of, and a new account at every stage of its progress, provided there is any progress. Then, too, there is considerable evidence that men who are interested in real estate take pains to have it announced that a company with a very large capital stock has been formed, and will build immense factories in the town where this real estate is located, often stating that this concern is to move from some northern or eastern town. Every such report that people can be made to believe, helps in obtaining high prices for lots, and hence the incentive for the invention and circulation of the reports.

It is well-nigh impossible for any newspaper to sift and ascertain the full particulars regarding each and every one of these matters, and the only thing that can be done is for those interested to go through the listing process before becoming involved in any way. Attention has been called to the fact that a single issue of the paper named recently contained notices of the formation of companies for various industrial purposes in the South, representing a capital of \$10,000,000. It is a weekly paper, and it is easy to see that, if all these were bona fide, there would soon be no room left there for agricultural operations.

We repeat that it is true the South is advancing rapidly in these matters; but to those who might be inclined to think, from the preponderance of manufacturing news from that quarter, that the rest of the country was soon to be rendered of secondary importance in manufacturing matters, we would suggest going a little slow toward such a conclusion.

THE STATE OWNERSHIP OF RAILWAYS IN FRANCE.—When the network of State railways was created in France, it was intended to serve as an example of economical management and efficient working for the great companies. Whether those expectations have been realized may be judged from the results obtained in 1889. By purchases of lines originally, and subsequent extensions, the State network now forms a total of about 1650 miles. Their cost was about 800 millions, and the receipts last year exceeded the working expenses by \$258,697. The net revenue on capital was consequently a little over one per cent, and as the purchase-money was raised by the Treasury at four per cent, including the sinking fund, the actual loss on the year was nearly 24 millions. The proportion of working expenses to receipts was 76½ per cent, while those of the great companies ranged from 44 to 55 per cent. It must be admitted that all the great trunk lines belong to the companies, but they have also a number of secondary lines, worked at 80 or 90 per cent, or at a loss, the construction of which was imposed on them. The companies, however, pay a large sum to the State in the form of stamps on their shares and debentures, taxes on transfers, and dividends, etc., while the State lines yield nothing. The experiment can scarcely be considered a success.—*London Railway News*.

CURVES AND CABLE GRIPS.—The Consolidated Piedmont Cable Company of Alameda was made defendant in a suit in equity filed in the United States Court last week. The complainant corporation, the Pacific Cable Railroad Company of this city, alleges an infringement of certain patent rights by the defendant. It claims that Andrew S. Hallidie invented a tramway for curves and cable grips and obtained a patent for them. In June, 1886, he transferred all his rights and interests in them to the Pacific Cable Railroad Company. After the issuance of the letters patent, it is asserted the Piedmont company made and used and is now using an infringement of the patent. The complainant desires such damages as the court may deem proper, demands a delivery of all apparatus infringing the patent, and wants an injunction against its further use by the defendant.

NITRO GLYCERINE ABSORBENT.—Towle Bros. have out 12,600,000 feet of lumber this year. The pulp-mill will start up soon on material from 2000 cords of tamarack and fir. The firm has just placed in the pulp-mill a plant to convert sawdust into dry pulp for the use of giant powder manufacturers, says the *Truckee Republican*. The sawdust is ground very fine between millstones and is bolted like flour. It is used as an absorbent of nitro-glycerine in the manufacture of giant powder and other explosives. Its production is a new industry on this coast, and much of it has even been brought from Norway. Towle Bros. utilize the dust from their sawmills and also from the planing-mill for making this new material.

Black-listing Men.

The Supreme Court of the State of Texas has recently decided a case which has an important bearing on the matter of "black-listing" men by railroad companies. A man named Behee, who was formerly employed by the Missouri Pacific railroad, was discharged for alleged incompetency, and at the same time was black-listed, so that he could not obtain employment on any of the roads of Texas. He brought suit for damages and was defeated in the lower court, but on appeal to the higher court was awarded \$10,000 damages.

Where a man has been employed by a railroad company and has clearly shown that he is incompetent, and therefore liable to cause loss of life and property, it would certainly be a good thing if, by some means, other roads could be spared the trouble and responsibility of also making a trial of him to again demonstrate his incompetency, especially as this demonstration is liable to cause loss of property by the road, and of the lives of fellow-employees or passengers. Black-listing, if it were only employed in the case of men who were clearly and indisputably incompetent for railroad service, would accomplish this object and would result in substantial justice being done. But as it has been carried on, it has resulted in a great deal of injustice and undeserved hardship. Men who have offended the officers of roads in some way for which they were not in the least to blame, have in many cases, by the operation of the black-list, been prevented from obtaining positions by which they could obtain an honest living. We suppose that where a man has shown clearly that he is mentally or physically unfitted for service on a road, and that it is therefore dangerous to employ him on one, the courts would uphold the roads in protecting themselves against him; but it is a good thing that it has been by this decision shown that the black-list if used at all must be used with great care, and for good and sufficient reasons, not on account of the whims of any one, nor his personal spite.

THE MANUFACTURE OF RUBIES.—What is the use of exploring unknown and dangerous countries for rubies, when the secret of their artificial production has been discovered? This was the question which the Academy of Sciences discussed on the report of MM. Freymy and Verneil, who for some time past have been making chemical experiments in the manufacture of these stones. More valuable than mere theory was the fact that the two chemists exhibited some hundreds of specimens of the glittering red crystals they had succeeded in producing. The rubies were admitted by all to be much superior to anything hitherto manufactured. No little danger, however, attends the process. The chemicals have to be fused at a heat so intense that M. Verneil during the course of the experiments nearly lost his sight. While manufacturing rubies the two chemists found that at a certain stage of the operations crystals of the color of sapphires were produced, but the blue hitherto obtained has not been equal to the tint of the real gem.—*Pall Mall Gazette*.

HEINRICH SCHLIMMANN, the famous archaeologist, died at Berlin on Dec. 25th. He amassed a considerable fortune in commercial pursuits and was able to devote much time to the study of the classics. In 1863 he retired from business with the intention of exploring the Troad, but deferred the work until 1870, when he sought the historic ground which, largely through his efforts, has yielded treasures of incalculable value to archaeology and to modern knowledge of that fabled land. He spent the seasons of 1871-8 in excavating the plain of Hissadik, which he has ever since maintained to be the site of ancient Troy. This exploration has been his chief but not his only work. He published many volumes containing the result of his researches, and elaborate arguments based upon them.

MORE than half the railway track in the world is on this continent, and nearly half of the whole is in the United States. This proportion may or may not be kept up, as Asia and Africa are beginning to shorten their long distances by using steam hordes on the iron track. In the past four years 40,000 miles of track have been laid in America, and in the United States 30,000 miles of this, while all the rest of the world built only 24,000. Railroads in Europe cost an average of \$115,000 per mile. Here the average cost is \$60,000, and this is about the rate elsewhere. Rates of fare are, however, lower in Europe than here, the denser population and lighter expense for running the roads more than offsetting the difference in their original cost.

ACCORDING to recent news from Brazil, there are now 60 steamers plying on the Amazon, nearly all of them belonging to British capitalists; and it is stated that this commercial fleet will be greatly enlarged before the end of another year through British enterprise. Many of these steamers are of heavy tonnage and are more stanchly built than those that ply on the Mississippi. They carry on business with the towns along the banks of the Amazon, and some of them traverse its main affluents, the Rio Negro and Rio Madeira, while others go so far up toward its navigable headwaters that there is now a probability of its soon becoming a highway for Peruvians bound for Europe.

Proposed State Irrigation Service.

A little more than a year ago, Mr. A. J. Pillsbury, one of the editors of the *Tulare Register*, conceived the idea that inasmuch as the irrigation districts being formed under the Wright law were feeling their way along slowly and painfully over an untried road, an association of district officers ought to be formed by means of which an interchange of experiences might be had which would be decidedly helpful. The matter was talked up in the *Register* and other papers, and finally the Board of Directors of Tulare Irrigation District sent out invitations to other districts for a meeting at Tulare. The meeting was held on the 12th and 13th of September last and was very successful. It was there decided that a permanent association should be formed, and a committee was appointed to perfect a plan for organization, but only a sort of provisional form of government has thus far been effected.

Mr. Pillsbury was made secretary of this provisional form of association, and has maintained quite an active correspondence with districts and prominent friends of the district system ever since, and with the result that the subject has so grown upon him that, in his judgment, no form of association less comprehensive than his draft of a bill provides for will prove adequate to the needs of the district system of irrigation in California. This draft will be submitted to the next meeting of the association, to be held at Sacramento January 8th, and after undergoing such changes as are deemed advisable, will doubtless be presented to the Legislature.

The theory upon which this draft is founded is that irrigation is the paramount interest in California; that the State cannot become greatly populous without it, but can sustain a tremendous population when all of its waters shall have been put to economical and intelligent use; that the district system of irrigation is the only system which can enable irrigating neighborhoods to command capital for constructing needed irrigation works, or compel a frugal use of the waters of this State, and that the district system will in time supersede all other systems.

The State has conferred very great powers upon these irrigation districts, including the power to create bonded indebtedness, a power that is very likely to lead communities into extravagances, especially if there should chance to be a bit of a boom on anywhere, and very likely also to prompt sharpers to enter upon schemes of a swindling nature. There is certainly no lack of opportunity for extravagance and speculation, and a most rigid system of supervision is imperatively demanded; yet, strange to say, the State exercises no supervision whatever outside of the judiciary, which can do nothing of its own volition and so must be an inadequate protection.

It is proposed in the draft as printed below that the State shall delegate this supervisory power to the associated districts themselves, and certainly nobody can be more deeply interested in maintaining the faith and credit of all the districts. It is made the duty of the association to examine into the conduct of every district and publish reports of their condition. This alone will have a most salutary effect, but as the association is forbidden to negotiate the bonds of any district until its acts have been approved by a civil engineer and an attorney, to be selected by the association, it will be nearly impossible for any district to market its bonds without such approval, for capitalists will soon come to require it before considering purchases of bonds.

The financial aid asked from the State is not great. Indeed it is much less than other interests are getting. It is only asked that the secretary's office shall be maintained and the printing be done at public charge, which will cost no more than \$5000 a year at the outside. This is much cheaper than the State could discharge its duty of supervision for by any other method.

Of course there are other services besides that of supervision of districts, which it is expected that the association will perform. It is expected that it will develop a market for irrigation district bonds, hold annual conventions wherein the experiences of irrigators from all portions of the State will be compared and important recommendations made as to methods, and, by a system of correspondence and issue, and of bulletins, keep all the districts informed as to methods of procedure adopted here and there. In this way the best heads among the directors of all the districts will, by their advice and example, be able to shape the work for the districts throughout the State. In fact there seems to be no limit to the good results which might flow from associated action among all the irrigation districts of California, properly empowered and aided by the State.

The Proposed Law.

Mr. Pillsbury submits the following draft of a bill wholly upon his own individual responsibility, and not as an official act of the association with which he is connected.

The People of the State of California, represented in Senate and Assembly, do enact as follows:

SECTION 1. It shall be lawful for five or more irrigation districts organized under and by virtue of an Act entitled "An Act to provide for the organization and government of irrigation districts," approved March 7, 1887, to unite in forming a State Association of Irrigation Districts to which all irrigation districts

organized or to be organized under and by virtue of said Act shall be entitled to membership upon terms of equality. Such association when formed shall be a State institution.

SEC. 2. The State Association of Irrigation Districts shall have power and it shall be its duty to inquire into the acts and inspect the works of all irrigation districts organized or to be organized under the laws of this State, and its authorized agents shall not be denied access to the books and archives of any of said districts. Said association shall have power to make, ordain and establish and put into execution such by-laws, ordinances, rules and regulations as shall be necessary for the good government of said association; provided that said by-laws, ordinances, rules and regulations shall not be inconsistent with the laws or Constitution of this State or of the United States. Said association shall have power to contract and be contracted with, to sue and be sued, and its purpose shall be to promote the development of the district system of irrigation in California by securing the co-operation of the irrigation districts of the State in a united effort to that end. Said association shall have power to act as special agent for any irrigation district affiliated therewith, and when duly authorized so to act by such district may do any of the acts which such district itself may do, but said association shall have no power to bind any district without such special authority except as herein provided.

SEC. 3. The State Association of Irrigation Districts shall meet in open session in October of each year upon such day and at such place as shall have been determined at the preceding annual meeting, and each district belonging to such association shall be entitled to one vote in the meetings of such association and shall designate some number of its board of directors to represent such district at such meetings. Provision shall be made at such meetings for consideration and discussion of matters important to the development of irrigation in California and industries dependent thereon; and it shall be the duty of said association to use all suitable means to collect and diffuse such information as is calculated to aid in the development of irrigation and the district system thereof in this State, and shall make such recommendations and suggestions as experience and good policy shall dictate.

SEC. 4. The officers of said association shall consist of a board of five trustees, to be selected from among its accredited representatives, in whom shall vest the general prudential and financial affairs of said association, and whose duty it shall be to execute its by-laws, ordinances, rules, regulations and recommendations. There shall also be a president and vice-president of said association, who shall be members of the board of trustees and ex-officio president and vice-president thereof; and a secretary and treasurer who shall not be members of said board. The president and two trustees shall, at the first meeting of this association held subsequent to the approval of this Act, be elected to hold office until the second annual meeting of said association, and the vice-president and one trustee shall be elected to hold office until the first annual meeting held subsequent to the approval of this Act; and thereafter the terms of office of all trustees shall be two years, but all shall hold office until their successors have been elected and have qualified. If from any cause a vacancy shall occur in said board, it shall be filled by the remaining members until the next annual meeting of the association. The secretary and treasurer shall be appointed by the board of trustees and shall hold office for two years unless removed for good cause shown.

SEC. 5. For its maintenance said association shall have power, at its annual meetings, to levy an assessment upon the taxable property of all irrigation districts belonging thereto not to exceed one cent upon each \$100 of assessed valuation of property in such districts, and it shall be the duty of the boards of directors of such districts to include the same in their next regular tax levy, to collect the same with its other taxes and pay it over to the treasurer of the association on or before the first day of March of each year. The by-laws of said association may also provide for the payment by each district of an admission fee of \$50, before being entitled to membership therein. The association shall have the power to negotiate the sale of bonds of any district belonging thereto, when specially authorized so to do, and at a price not lower than a minimum price to be prescribed by the board of directors of said district, but before undertaking to negotiate the sale of such bonds, the legality of such bonds must be affirmed by an attorney to be selected by the board of trustees of said association, and the proposed works must be approved by a civil engineer to be selected by said trustees. The expense of such affirmation and approval shall be borne by the district offering bonds for sale, and for its services in selling said bonds the association shall be entitled to receive a commission not exceeding one per centum upon the face value of said bonds so sold, but from which said commission there shall be deducted the expense of affirmation and approval above referred to, whereupon the residue shall be paid to the treasurer of said association and become a part of the general fund thereof.

SEC. 6. It shall be the duty of the secretary of said association to attend all meetings of the association and of the board of trustees, and to make and preserve a record of such meetings; to conduct the correspondence of the association

and of the board of trustees and preserve a record of the same; to collect statistics and other information showing the actual condition and progress of irrigation in this State and elsewhere; to keep all accounts of the association and of the board of trustees; to visit each irrigation district in the State and prepare and cause to be published a report touching the area, character of soil and productions of said district, together with the nature and cost of irrigation works, quantity of water utilized, source of water supply, system of distribution, and such other matters as the board of trustees or association shall require, or shall seem to be of public concern. He shall correspond with investors and financial agencies, and use all proper means to develop and maintain a ready market for irrigation district bonds. He shall collect books, papers and pamphlets relating to irrigation and forms of production dependent thereon, and preserve the same. Under direction of the association and the board of trustees, he shall prepare for publication such reports as are required by law or the association or trustees; and by means of the issuance of periodical bulletins, he shall keep the irrigation districts belonging to the association constantly advised concerning all occurrences touching their interests. He shall appoint, subject to the approval of the board of trustees, a competent person as clerk and shall be responsible for the acts of said clerk. He shall maintain an office in the city of San Francisco at an expense for rent, stationery and incidentals, not exceeding \$500 per annum, and said office shall be open daily, except Sundays and legal holidays, from nine o'clock A. M. to four o'clock P. M. He shall be paid for his services as secretary the sum of \$200 per month, and his actual traveling expenses not to exceed \$500 during any one year. His clerk shall be paid a salary (as such clerk) of \$50 per month, each to be paid as other State officers are paid. Said expenditures herein provided for are to date from the day upon which a copy of the by-laws of said association, together with a certificate of organization, signed by the president and secretary thereof, is filed in the office of Secretary of State, and are to be paid out of the general fund in the State treasury.

SEC. 7. All printing required to be done by this Act shall be done by the State Printer.

An Irrigation Convention.

A session of the State Association of Irrigation Districts of California is hereby called to meet at Sacramento, California (in such hall of meeting as shall hereafter be determined upon, due notice whereof will be given), upon Thursday, Jan. 8, 1891, at 10 o'clock A. M.

The purposes of said meeting will be to perfect the organization of said State Association of Irrigation Districts; to agree upon and formulate such amendments to the irrigation laws of this State as shall be deemed needful and expedient; to use all proper means to secure their enactment by the Legislature and approval by the Governor; and to consider such other matters as the association shall be pleased to consider.

In the deliberations of such association each irrigation district which shall have become a member thereof, shall be entitled to one vote, and the board of directors of such district should designate, by resolution, one of their number who shall be empowered to cast the vote of such district, and a copy of such resolution under seal of said district shall constitute the credentials required. It is earnestly hoped that every irrigation district in California will be authoritatively represented at such meeting, for it is believed that it will be productive of most important results. It will not be objectionable to have more than one member of district boards of directors as well as other district officers present, and doubtless they will be asked to take part in the discussions (but not in the balloting), and it would be well, too, for each district to extend to known friends of the district system a cordial invitation to be present with full privileges as to debate.

The dispatching of business would be much facilitated if persons having amendments to the law to be proposed would reduce them, as nearly as may be, to proper form before presentation. Districts which have not already joined the association will be given an opportunity to join when the association meets.

J. W. NANCE, President.

A. J. PILLSBURY, Secretary.

ADVISED FROM OHIO report a diminishing supply of natural gas at important manufacturing centers. It can hardly be said that the wells are failing, but the fact is patent that the volume now available is much less than a year since. In other localities the same conditions have been encountered, but the wells were found to have become choked by deposits from the gas, and to have flowed as freely as ever when the obstructions were removed. The manufacturers of Columbus have taken no chances on this contingency, however, but have turned to other fuel. In the cities of Toledo, Dayton, Springfield and Urbana, heavy consumers have been notified by the gas companies to use other fuel, as domestic consumers only will hereafter be supplied. Coal-miners and coal-carrying railroads are of course taking much comfort from this condition of affairs.

ANCIENT CHINESE DRAWINGS.—In collections centuries old, to be seen in China and Japan, are specimens of the most remarkable drawings in the world—pictures of all kinds drawn with the thumb nail.

England as Well as America Suffers Through Lack of Money.

England secured its gigantic commercial finances as much by wise financiering as through the activity or enterprise of its merchants. It had a large, ample metallic and paper currency which it loaned and diffused throughout the world. This yielded a hundred-fold return. Of late years, England's currency, like our own, has become contracted through the growth of wealth and the necessary absorption of money. While heretofore she was able to supply foreign requirements, she is now hardly able to attend to home wants. It is not that there is less money, but that the growing interests of a vast people have so spread out that a great deal larger ratio of currency is requisite. The result being reflected is that in order to meet the home requirements, capital has to be withdrawn from foreign enterprises, commerce and investments that have heretofore been found profitable.

While England is to-day suffering from lack of a liberal currency, so is the United States suffering from a greatly contracted one. A pound sterling could practically go all over England in 24 hours, but in our country it takes over a week to pass from one end to the other.

To-day all the financiers of the country are anxiously watching the money market, fearful that the recent stringency of the market will be repeated with possibly more direful results. We do not fear any further immediate trouble in the Wall-street world, as danger pointed out clearly is seldom encountered. If financial troubles are to ensue, we believe that Wall street will be left behind and a visit paid to the mercantile interests.

This country—one and all, great and small—uses money. There is little gained by its being contracted, and no reason why it should stay so, except that our Government representatives lack the ability and intelligence of Chase, Hamilton, or Webster.

The currency of the people can be increased in divers ways, and there is no question which Congress can study with greater benefit to our people than by what way it is to be done.—*Financial Record.*

THE UTILIZATION OF NIAGARA.—From information furnished by the Cataract Construction Co., it appears that at a consultation of the engineers of the company, held in London, it was decided, in starting the tunnel from the lower river, that the portal should be so located as to have its floor 20 feet below the average water level, the only part of the tunnel mouth showing above water being the arched roof of nine feet radius. From this opening the tunnel will be carried on an un-grade of 0.4% (4 feet per 1000), making the floor slope less than the hydraulic gradient required to enable a tunnel of 400 square feet section to deliver the water required to give 120,000 horse-power with a head of 140 feet. The expected theoretical advantage to be gained by treating the tunnel as a full running pipe war, we believe, carefully considered and anticipated by the partial submergence of the floor of the tunnel by the water of the lower river for about 5000 feet of its length, and the possible total submergence or filling from above by an adjustable regulator at or near the discharge mouth of the tunnel. The required hydraulic slope that may eventually be wanted is perhaps 0.7% (7 feet per 1000), or what will give a mean velocity of current of about 25 feet per second—a speed no greater than already exists in some parts of the Niagara river below the falls. It will doubtless be some years before the capacity of the tunnel will be taxed to its utmost, and until that time comes the tunnel will be a stone-walled waterway with an arched roof above the water. Access can be had to all parts of its length, the current due to the slope being such as will permit examination upon days when the fewest mills are running.

SUBMARINE TELEGRAPHS.—The international bureau of telegraph administrations has made an interesting report on the extent to which submarine telegraphy has grown. The submarine system of the world, says the report, embodies 120,079 nautical miles of cable, of which various Government administrations own and operate 12,524 miles, while the remainder is in the hands of private companies. The total cost of these cables is estimated to be \$200,000,000. The Eastern Telegraph Co., which owns the cable between England and India, operates 21,860 miles, with a far East extension of 12,958 miles more. Africa is completely surrounded by submarine cables, with an occasional branch to the coast, the last link having been finished to Cape Town only last year. To encircle the Dark Continent, 17,000 miles of cable was required, and a dozen or more companies, backed and aided by the British, French, Spanish and Portuguese Governments, participated in the work. The North Atlantic is spanned by 11 cables, all laid since 1870, and footing up an aggregate of over 30,000 miles between North America and Europe.

In the Mexican State of Sinaloa, where American capital has been largely invested, there are in operation three cotton mills and three sugar mills, and in the city of Mazatlan is a well-equipped iron foundry which is now turning out mining machinery said to be equal to imported.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

STOPPED MILLING.—Amador Ledger, Dec. 27: The McKenzie mill, running on Clinton Peak rock, has been compelled to suspend operations in consequence of the late rains having made hauling impracticable. It is expected that the new litigation in regard to the Amador gold-mill will stop the use of a portion of the mill for crushing the Doyle rock.

PLYMOUTH.—There are no contracts for wood and timbers being let at the mines so far as we can hear, which makes it look as if the mines would run on a very light scale next year.

SUTTER CREEK.—At the Lincoln, operations have been resumed under the supervision of Mrs. Slewart, who is an excellent financial manager. Everything at the North Star and Rose mines is moving along as usual.

Calaveras.

STICKLE.—Mountain Echo, Dec. 25: Levels are being run north and south on the 600-foot station in the Stickle mine. It is reported that 20 men have been laid off at the Union mine at Copperopolis.

CENTRAL HILL MINES.—Calaveras Prospect, Dec. 27: There is quite a boom on Central Hill at present. The Union Shaft gravel mine there has about 20 men employed. A new 8-stamp mill is being constructed under the management of Mr. Morrill. The mill will be completed as soon as possible. The Benson mine is looking better. Rich gravel has been found there lately. The Cassinelli mine is looking well. A small quantity of gravel was washed last week, and it paid better than was expected. The Agostini and Spinola claim is lying idle at present, but will be started up in the spring. The gravel claim formerly owned by Spinola & Ellis is being worked by C. W. Getchell. Several men have been clearing a road and ground on which to put a hoisting engine and pumping outfit, and as soon as the weather will permit in the spring, a shaft will be sunk to the ledge, with a view to prospecting the channel. The claim is on the famous blue lead and is undoubtedly rich.

El Dorado.

CRUSHING COMMENCED.—Georgetown Gazette, Dec. 27: We were over to the Van mine, a half mile north of town, on Tuesday afternoon, to see the Huntington mill work. It had been running steadily since it first started Monday morning, without a mishap—just 35 days since they broke ground. We were cordially received by Supt. P. P. Tischer and C. S. Hersey, the millwright and amalgamator. The mill works smoothly, with little noise and without a jar. The sieves are about 40 mesh and the discharge simply perfect. The mill is fed by a Hendy feeder. The upper silver plates cover a space 4x12 feet and the lower ones 2x12 feet. At the foot of the wide plates is a neatly finished dug-out trough, with a two or three inch drop, and below the lower plates another trough. The mill is now reducing 18 tons of the soft ore in 24 hours, which will undoubtedly be increased to 24 tons, as not a particle of gold or quick passes beyond the lower plates, more than twenty careful pao tests having been made, while pan tests of the pulp as it flows from the mill invariably show traces of fine gold. It is the plan of the amalgamator to retain nearly all the gold in the battery. We were permitted to make these tests to our entire satisfaction. While the ore on the dump never fails to show a good pay prospect, and not a particle passes beyond the plates, it is a matter of much satisfaction to all who are interested in securing an economical method of saving the fine gold of our mines that such a method has finally been established in our midst. Quick is used sparingly in the battery, a very little being added every half hour. Undoubtedly this is the most perfect gold-saving mill and plate arrangement that has ever operated in this district. Much credit is due to the skill of Mr. Hersey for the perfect manner in which the plant has been built. So perfectly adjusted is all the machinery that only 15 inches of water is required to run the mill and shaft pump. Six hundred feet of pipe conveys the water to a Pelton wheel under 130 feet pressure. The shaft is 55 feet in depth, 5x10 in the clear, being timbered in two compartments, and worked by two shifts of three men, two at the windlass. At 60 feet a crosscut will be made. At present the mill is fed with ore from the surface. Should the test prove satisfactory, more batteries will be added and hoisting works put up.

NOTES.—Georgetown Gazette, Dec. 27: Everything is running smoothly at the Taylor mine with a prospect of a good winter's run. The mill and hoisting works at the Van mine are expected to start up this week. The works are now under cover. The pump started up yesterday and work of sinking resumed to-day. The Lone Jack Co. is preparing to commence work in that mine soon. At present they are putting in new machinery to the hoist, and making preparations to sink. Hugh Nichols is to be their foreman. Strahl's slate quarry and works at Kelsey are running in good shape, under a force of 15 men. Mr. Dobbs, of the city meat market, brought up some fine samples of roofing slate from there last week, which is superior to any we have yet seen. It is said that the quality of the Kelsey slate is better than that of the Chili Bar quarry. When we see this fine roofing slate, and know how easily and cheaply it can be obtained, we wonder why it is not more universally used. Who will be the first to put on a slate roof in Georgetown?

Nevada.

THE HARMONY.—Tidings, Dec. 27: It is said that the strike in the Harmony gravel mine is developing richer than ever and that the clean-up from gravel worked exceeded expectations.

THE IDAHO COMPANY TO PROSPECT.—The Idaho Company will soon place a water-power plant on the shaft on the croppings north of what has heretofore been considered the lode line and which is now supposed to indicate the true line of the Eureka Idaho Maryland lode. The shaft is on the ground recently acquired from the Maryland company, is 40 feet in depth, and shows a strong vein. It is to be given depth and this theory confirmed or proven false. It is likely, however, that the theory will hold good and much valuable quartz be found.

SPECIMENS FROM THE EMPIRE.—In the 1500

level of the Empire mine very rich rock has been found in the ledge. One piece extracted is worth \$1000 and that extracted altogether will foot up several thousand dollars. Pretty good for the oldest working mine in the district!

ONONDAGA MINING COMPANY.—The annual meeting of this company was held Tuesday and directors and officers elected as follows: Geo. Fletcher, Pres.; Jno. F. Kidder, Vice pres.; E. H. Brown, M. L. Elliott and J. B. Wright, the latter of Sacramento, Thomas J. Mitchell is Treasurer and Secretary and M. L. Elliott is Superintendent. An assessment of one cent per share was levied.

MANHATTAN.—The new chute of ore cut in the Manhattan mine recently has increased in size and somewhat deteriorated in quality.

EMPIRE MINE.—Grass Valley Union, Dec. 27: Rumors ran high on Wednesday concerning the Empire mine. A specimen "streak" was struck in the 1500 level and all the forenoon a large amount of gold specimens was taken from the level. Several rumors were to the effect that \$1700 were taken out in specimens during the forenoon, but Mr. Starr, superintendent of the mine, informs our scribe that the amount did not reach that figure. Mr. Starr also informs us that the ledge where they are now working on the 1500 is a large ore and very valuable.

Placer.

MAYFLOWER.—Placer Herald, Dec. 27: F. Chappell, president of the Mayflower Mining Co., says that the Mayflower mine is in good shape and yielding lots of lucre.

THE GOLDEN RIVER.—Republican, Dec. 28: C. F. Hoffman, superintendent of the Hogback and Red Point mines, was in Auburn last Friday and showed a handful of coarse gold that was taken out of the gravel where the upraise from the lower Hogback tunnel cut through the rimrock into the channel. The gold is in the form of small nuggets, and in that respect differs from that taken out at Red Point, which is in the form of scales. The difference in the character of the gold tends to confirm the opinion, based upon the trend of the rimrock and other facts, that the channel struck at Hogback is not the one encountered at Red Point. All the surveys that have been made indicate that there are at least two channels down that divide. The bottom of the channel has not been reached at Hogback, but the inequalities of the bedrock are being followed by a drift, and it is expected that the trough will be found soon. The flooding of coarse gold in the gravel along the rim and above the bottom indicates that the channel is very rich and will yield big returns. Twenty-two men are now at work in the Hogback tunnel. At Red Point about 60 men are employed and the mine is yielding between \$4000 and \$6000 a month. In 1889 the Red Point gravel yielded \$3 a carload, and the total yield for the year was \$65,000. For 1890, up to December, the mine produced \$54,000, the value of the gravel per carload being \$2.50. Under favorable conditions \$2.50 per carload will pay expenses, all over that being profit, but the Red Point channel narrowed down and ran into a hole, which increased the cost of working and taking out the gravel. Water impeded the work and the miners were obliged to throw the gravel up two platforms to get it out. The irregularity of the bedrock prevented the laying of tracks for ore cars, and wheelbarrows had to be used in place of cars. The extra expense wiped out the margin of profit, and although the mine paid expenses, the stockholders got no dividends. Supt. Hoffman reports that the channel is widening and he hopes to make the mine a dividend-paying property next year. The French company that owns the Red Point and Hogback mines has spent a great deal of money but has received no dividends yet. The Red Point frequently has yielded a great deal more than enough to pay expenses, but the surplus has been applied to development work and the extension of the tunnel.

San Diego.

MINES AROUND JULIAN.—Sentinel, Dec. 26: The Owens mine, as was announced last week, has changed hands. Hugh R. Hildreth, of San Diego, one of the directors of the First National Bank, is principal owner and general manager. William Goodwin has been chosen foreman of the mine and W. J. Holmes foreman of the mill. Their own hoist is on the ground and being put in place. The boiler will arrive next week and be put down as soon as possible. The machinery is being overhauled and put in good shape for a long run. The work of hauling out the water will commence as soon as the tank arrives, and when finished a force of men will be put to work taking out ore for the mill and thoroughly developing the mine. The Owens has been one of the best paying properties in the camp, and now that it is in the hands of competent men, backed by capital, it will begin to turn out the bullion as of yore. Mr. Hildreth is one of the principal owners of the 4th of July mine situated only 200 yards from the main street of Julian. They have already applied for a patent and as soon as the Owens is pumped out and in working order the small hoist will be moved to the 4th of July and the work of development commenced in good earnest. At present the shaft on this mine is only 50 feet deep and already water has been struck. The ledge is one of the largest in the camp and some very flattering assays have been obtained from ore out of the bottom of the shaft.

CINCINNATI BELLE.—Superintendent Wilkins was in from the Gold King this week and informed us that the Cincinnati Belle would start up again next week. It will be remembered that this is the mine out of which so much specimen ore was taken by W. L. Fredericks. It has been idle now for some time, owing to bad roads for getting in material, but now that the new grade is finished and machinery and supplies can be got to the property it will again be worked and the rich ore mined at the Gold King mill in Banner, now nearing completion.

THE BIG TUNNEL.—Through the courtesy of Waldo Waterman we had the privilege of examining the Blue Hill tunnel last week. It is now into the mountain a distance of nearly 400 feet. Several ledges have already been cut and when we were there the face of the tunnel was showing some fine-looking quartz. Six hundred feet has yet to be run before the contract is completed. The tunnel is a fine piece of work and a credit to the contractors, who are making good pay as they go along.

LONE OAK.—A. J. Burnett is still sinking on the Lone Oak, with flattering success.

BLACK EAGLE.—The Black Eagle M. Co. this week filed articles of incorporation, capital stock, \$500,000.

This, it will be remembered, is the new strike on the Mesa Graode.

FRACTION.—Good reports come from the Fraction mine, owned by MacDonald and Waterman. They are taking out good ore.

Shaeta.

FLAT CREEK.—Redding Free Press, Dec. 27: George Smith sold a mine on Flat Creek—the property of Mr. Longfield—this week, to the reduction works below town. These works, we understand, will be removed to the mine purchased. Flat Creek is rich in gold quartz, some of the finest specimens coming from that section. The trouble has been in working the quartz, the fineness of the gold causing it to escape, but under the dry process it is thought that it can be saved.

RICH SPOT.—John Tiffin says that he made a good stake for Christmas in the following manner: He had given away his prospecting pans, but wishing to do a little prospecting, gave an acquaintance 25 cents for a pan. He asked if it was a lucky pan, and was told that it was. So he went to his old stamping ground in the Lower Springs district, and while prospecting a short distance from Miller's house, got \$50 in gold and quartz from a single pan of dirt. These rich spots are not all discovered yet.

COAL.—The recent discovery of valuable coal in this county seems to create considerable comment and it is to be hoped that capital will become interested and another profitable industry added to those already established. After coal mining will come discoveries of natural gas and coal oil.

STRIKE.—A correspondent writing from Delta says: "A rich strike was made recently on Chace gulch, a tributary of Dog creek. The ledge crops out a foot or two above the ground for 1000 feet down the mountain side. The ledge is rich in free millio gold, and was discovered and located by Asa Elsoo and Thomas O. Roberts."

Sierra.

TRAMWAY.—Mountain Messenger, Dec. 27: We understand that the tramway at the Mountain mine is working finely. A gentleman named Bernhardt is out from New York to examine the Red Chief mine, near Forest City. Mr. Turner has bought the quartz property, formerly owned by A. W. Crowell, at Nigger Canyon.

Trinitv.

NEW RIVER.—Journal, Dec. 27: J. A. McLeod of New River is in town this week and says times are rather quiet in New River this winter. The following mines are being operated: The Mountain Boomer, Hard Tack, Sherwood, Excelsior, Uncle Sam and Ridgeway. Considerable work is being done on leases. On the Ridgeway they have raised 160 feet from the tunnel and are now running a level to tap the ledge. Ore is being taken out and development work being done on the other mines. Two mills are running. There are about 60 men in camp and some sickness prevails. No snow in the camp at present.

CANYON CREEK.—On our visit to Canyon Creek last Saturday we learned that Grigsby, Shock & Shattuck were making a good run on very good-looking ore. They have not made a clean-up yet, but the battery and plates show very well, and the clean-up when made will no doubt prove satisfactory. Their ledge is looking better than ever and we think the Buck's Ranch mine is sure to turn out well. At the Chloride mine there is not sufficient water with which to turn the mill and it is not likely to increase very much till about February.

SUPT. APPOINTED.—J. R. Flagg has been appointed Superintendent of the Taylor Flat mine. Mr. Flagg is a practical miner of many years' experience, and very few can handle a mine to better advantage than he.

Tuolumne.

COSMOPOLITE MINE.—Union Democrat, Dec. 27: Messrs. Stanley, Pool and Shaw have driven a tunnel into new ground on the Cosmopolite mines at Groveland and now have a very promising prospect to the face of the tuooel. The quartz will be worked in a mill, after it has been carefully sorted and the pockets or specimens picked out and worked up in a hand crusher. This is a vein that our old-timers say never broke any one and never failed to pay any one who worked it, so the owners look for a golden harvest soon. The vein yields pockets, over large, but the miner's tradition says plenty of them.

INCORPORATED.—Independent, Dec. 27: Otto Kanig returned from San Francisco this week. During his absence he has succeeded in incorporating the Chlorinda Consolidated Mining Co., the property of which is situated about a mile above Parro's Ferry on the Stanislaus river, formerly known as the McKenny and Kanig quartz mine. Half of the capital stock will be sold, and the proceeds devoted to developing the property. About 6000 shares have already been sold, most of the buyers living in San Francisco.

NEVADA.

Wahoe District.

HALE & NORCROSS.—Virginia Enterprise, Dec. 27: On the 800 level the west crosscut is still in vein porphyry. The east crosscut on the 900 level has passed out of low-grade quartz into porphyry. The west opposite the east crosscut was advanced 20 feet; total length, 40 feet. This crosscut has passed through some rich ore. The face is now in hard quartz and porphyry.

EXCHEQUER.—East crosscut, 150 feet south of north line, 500 level, is out 354 feet; face in clay and porphyry and stringers of quartz.

SAVAGE.—The winze from the track floor on the 1300 level still continues in good ore. A good deal of exploring work is being done and ore is being mined on the 300, 400, 500, 600, 750 and 1300 levels. Are sending weekly to the Mexican mill about 500 tons of ore, averaging \$16 25 a ton.

SILVER HILL.—160 level: Northeast drift from winze is out 530 feet; face in porphyry. 334 level: Northwest drift is out 735 feet; face in hard porphyry.

CON. NEW YORK.—The north drift on the 850 level is out from No. 1 west crosscut 473 feet; face in porphyry. The north drift on the 1100 level is in from the shaft 360 feet; face in quartz and porphyry.

ANDES.—During the past week north drift, 420 level, was advanced 15 feet; the face in porphyry and clay. South drift, 420 level, was extended 19 feet; formation, clay and porphyry.

SEG. BELCHER.—The 850 raise is in a mixture of quartz and porphyry that gives low assays.

JUSTICE.—The north drift, 822 level, is out 130

feet and is in hard rock. The west drift, 822 level, is out 142 feet; face in low-grade quartz. There has been no work done on the 370 level since last report. Are shipping to the mill an average of 180 tons of ore assaying \$20.50 a ton.

OVERMAN.—Good progress is making in the raise and drift on the 100 level.

UTAH.—The north lateral drift from the main west drift from the shaft has been extended 50 feet; total length, 128 feet, in a porphyry, clay and quartz formation.

CHALLENGE CON.—The joint north drift on the 300 level has developed a two-foot streak of fair ore.

CROWN POINT.—The new northwest drift on the 500 level still continues in soft and favorable material. Are extracting from the 1800 stop about 15 tons of ore per day that assays from \$18 to \$20 per ton.

BELCHER.—West crosscut No. 1 on the 290 level is being pushed for the west wall. The south drift on the same level continues to cut bunches and streaks of ore. The raise on this level is still in a mixture of clay and quartz. About 250 tons of ore a week are being sent to the Vivian mill; average assay, \$18.50 a ton.

CON. CAL. & VA.—Ore continues to be extracted from the 1200, 1300, 1500, 1600 and 1650 levels. A considerable amount of exploration work is also being done in the mine. About the usual number of tons of ore will be sent to the river mills this week. The average assay value will be about the same as last week.

ALTA.—The stopes are yielding the usual quality of ore, and the mill is crushing about 315 tons of \$18 rock, as per battery samples, and are doing prospecting work.

YELLOW JACKET.—Doing extensive prospecting throughout the mine and milling about 60 tons of \$18 ore daily.

IMPERIAL.—On the upper levels the old stopes are being overhauled and some fair milling ore found.

OPHIR.—The south drift from the west drift on the 1300 level is still in quartz that gives low assays.

UNION CON.—No. 2 crosscut from the north lateral drift on the 1450 level is being advanced in a soft and favorable porphyry formation.

SIERRA NEVADA.—The northwest drift from the 630 shaft station is making good headway in a porphyry formation.

MEXICAN.—East crosscut No. 1 from the main north lateral drift continues in a porphyry formation showing some clay.

KENTUCK.—Still repairing and retimbering the main shaft.

OCCIDENTAL CON.—Have discontinued extraction of ore for the present on the 350, 400 and 450 levels and are now engaged in timbering and repairing tracks and chutes. The south drift from the bottom of No. 5 incline on the 650 level, is in 64 feet, showing low grade ore. Milled during the week 285 tons of ore of the average value of \$16.10 per ton.

POTOSI.—The face of the north lateral drift on the 1200 level is in ore of a fair grade. The south lateral drift from the Chollar incline, 1300 level, is still in porphyry.

WEST CONSTOCK.—Are making a road from the lower tunnel to connect with the Ophir grade, and when completed, will commence to ship ore to Taylor's mill, Silver City, there being a large quantity of high-grade ore on hand.

CHOLLAR.—Extracted and sent to the mill the past week 542 tons of ore. Average battery assay, \$18.31 a ton.

MASCOT.—In running a cut on the ground have come to a fine looking ledge of quartz giving some good assays.

Belmont District.

RICH ORE.—Belmont Courier, Dec. 25: Green Aldrich has made a rich strike in his mine, situated about 1½ miles east of Belmont. The ore is very rich in silver, assaying all the way from \$800 to \$1500 to the ton. He has now 1½ tons of this class of ore in sacks. The indications are that he has encountered a body of good ore, and if it holds out, there will be at least one Belmonter who will be able to take in the World's Fair at Chicago.

Cortez District.

THE CORTEZ MINE.—People's Advocate, Dec. 27: The Cortez mining property is the most valuable, all things considered, in the State. While the mines are situated about three-quarters of a mile in Eureka county, the mill, assay office, blacksmith shop, three large stables, store and hotel are some 1400 feet in Lander county. There are 30 men constantly employed about the premises in this county, and probably 75 in the mines. The employment is steady, lasting as long as the work is faithfully performed and the employed desires his position. It is conceded that the monthly profit of the Cortez plant is in the neighborhood of \$30,000, and everything is done on a cash basis.

Ellsworth District.

COPPER.—Belmont Courier, Dec. 27: Some rich silver and copper ore was hauled recently from Ellsworth to the Ledlie reduction works. Good ore is known to exist in that part of Nye county.

Eureka District.

ORE SHIPMENTS.—Eureka Sentinel, Dec. 27: During the week the Eureka and Palisade Railroad Co. shipped 215 tons of ore to the Salt Lake City smelters. The following lots of ore were received at the Eureka Con. reduction works for treatment during the week: From the Dunderberg mine, 25 tons; Silver Nugget, 5½ tons; Summit, 36 tons; Belmont, 10 tons; Williamsburg, 14 tons; Hanburg, 65½ tons; White Pine, 17½ tons; Silver West, 28 tons; Wide West, 25 tons; Woodchopper, 4½ tons; Phenix, 58½ tons; Seventy-six, 2½ tons; Reveille, 4 tons; Lord Byron, 22½ tons; J. W. Lambert, 3½ tons.

Jefferson District.

SILVER ORES.—Belmont Courier, Dec. 27: The miners of Jefferson district, who have had several tons of silver ore worked at the Ledlie works, are well pleased with the result of the crushing. Some of the ore proved to be quite rich.

Lewis District.

CONSOLIDATED.—Virginia Enterprise, Dec. 27: All the mining claims on the main lode of Lewis have been consolidated. Lewis is 14 miles south of Battle Mountain, in the Toiyabe mountains. The camp once had a population of 400. The lode is about 10 feet wide, assays from \$15 to \$175 and crops out for over a mile. The mines in Lewis can-

yon were discovered in 1872. The cause of the collapse is plain when we learn that only \$50,000 was ever spent in development work, while \$500,000 was expended in building reduction works. Had the order of expenditure been reversed, all would no doubt have prospered.

Tybo District.

LEACHING.—Belmont *Courier*, Dec. 27: The Tybo mill was running this week on ore from the Dimick mine. The leaching works are running satisfactorily.

Pahranagat Lake District.

WORK COMMENCED.—Pioche *Record*, Dec. 25: Mr. George S. Barber, mentioned last week as having taken a six months' bond and lease on the Bal-back mine in Pahranagat Lake district, went down to that place during the week to begin work on the property. Several loads of mining supplies left town during the week also, and work will be pushed vigorously. Nine men will be employed for the present.

ARIZONA.

MINING NOTES.—*Courier*, Dec. 25: Messrs. Helm & Cover have gone to the Tiger. Big doings in Copper Basin, just over the divide from Prescott. Mr. Williams, superintendent for Phelps, Dodge & Co., is erecting a roaster, leaching plant, etc. New Senator mill, belonging to same company, is ready to go. Mine said to be a big fellow and rich in gold. Prof. James Douglas, who got the company to invest here, is making us another visit. He sent a man north Saturday last to look up a deposit of lime. An electric plant, for placer mining is en route to Peeples Valley. Phelps, Dodge & Co. will send two carloads of Arizona ore, at their own expense, to the World's Fair.

GILA REND ITEMS.—The river, after several days of high water, became fordable to-day. Col. B. B. Barney has contracted with Eugene Caruthers for a ferry, to facilitate work under the new Citrus canal. A heavy hailstorm fell between here and Black Gap, 19 miles south, last Saturday. Frank D. Welcome is rushing freight through to Gunsight mine for the Silver Gilt Co. Peter Hargraves, while detained south of the river by high water, made a trip to Gunsight and was astonished at the immense ore reserves there. He returned to his ranch on Enterprise canal, 16 miles north of here, to-day.

IDAHO.

ANOTHER MINING DEAL.—*Avalanche*, Dec. 29: A deal was consummated this week between Mrs. A. J. Sands, of Caldwell, and M. F. Leech of Boulder, Colo.; John Longmaid and H. Stevenson of Salt Lake City, Utah, by which the three gentlemen become the owners of the Stormy Hill and War Eagle properties. They have already made arrangements for working the property. Simon Harris has been engaged as foreman, with orders to put on a double shift of men to re-timber the Stormy Hill shaft and sink the same as rapidly as practicable to the depth of 500 feet. A small hoist engine will be moved to the shaft at once, which will be used until spring, when a new shaft-house will be erected and a more complete equipment supplied. The War Eagle and Stormy Hill properties adjoin each other on the same ledge. The War Eagle was worked a number of years ago by a New York company, to a depth of 800 feet, and yielded about half a million dollars. It was worked north from the shaft to that depth for 150 feet, to the north boundary of the claim, and south on one of the lower levels nearly 600 feet, crossing in that distance a porphyry dyke, through and adjoining which very rich ore was opened up, and but very little stopping done. The Stormy Hill, which lies to the south of the War Eagle, has a shaft on it now 190 feet deep. This shaft is only 15 feet from the War Eagle south line and will be made the main working shaft of the two mines. Levels will be run from this shaft north into War Eagle ground, to connect with the old work. The Stormy Hill shaft has been in good pay ground almost from the surface and in the bottom of the shaft assays high. This property lies about 1000 feet east and parallel with the great Poorman lode. It has been considered a most promising property, but has been tied up for a number of years on account of business complications and the decease of Mr. A. S. Sands, the former owner. It has now passed into the hands of practical and experienced miners and business men, and promises to add to the production of the camp, and we believe from our own personal knowledge of the mines, will prove a big paying investment for the new operators.

THE NEW DISCOVERIES NORTH OF THE DE LAMAR.—Some ten days ago specimens of quartz very rich in horn silver were brought to town and a big story circulated concerning a rich find made by two brothers named Walneer, three or four miles north of De Lamar. We made no mention of this last week for the reason that such reports are often like bumble-bees, which when first hatched. In fact, we took the precaution to send a man there who reported that the story was exaggerated. Since then three prospectors, Messrs. Walter Stanley, Dave Farmer and Herb. Inman, have been at work near where the first find was made, and have made a location. They report that they have found a very rich ledge, more than two feet in width, which will run nearly 3000 to the ton. They say there is no doubt about their having a true and well defined vein of ore. They brought some very rich specimens of ore in with them. The ore is a hard gray quartz with thick seams of horn silver running through it. Their location is a few hundred feet north of the location made by the twin brothers, and they think on the same lode. The ore is identical in character. They say that where the twins found their ore the ledge had broken over and that they had been working above it, and that is the reason of the contradictory reports coming here. They also say that the ledge is located where no one but a tenderfoot would have thought of prospecting. It is only a few feet from a trail which has been traveled by miners and cowboys for many years. The season is now so far gone that no cabin can be built or supplies procured for the men for the winter, consequently but little more will be known of the find until spring.

FLINT REDIVIVUS.—The reconstruction of the big mill at Flint is now about completed and the battery stamps will next week waken the echoes of that canyon, which has heard no louder noise than the tinkle of a cow-bell or the bark of Bogle's dog "Kaiser" for nearly four years. When the rollers stopped crushing ore, four years ago, they were about 700 tons ahead of the concentrators then

used to save the mineral, and the failure of the rollers to crush fine enough left this amount of un-worked ore in the mill. Careful sampling and assays show this ore to be worth over \$45 per ton. It will all now be run through the batteries and over light humper concentrators, which it is thought will save a greater portion of its value. When this is done, if it is found that the tailings still retain value, roasters and pans will be put in and they will be reworked. In addition to the 700 tons now in the mill, some 400 tons of ore are being hauled from the property purchased by Mr. Leech last year. The latter is high grade ore, slightly base, and will be worked, if practicable, in the same manner. Should this enterprise prove successful, the Flint district will become a big camp. There is no doubt about the ore being there to keep more than one big mill running until worn out, and the ore is high grade. Its slightly refractory character is the only drawback. With William Quayle's, Judge Lynam's and other properties at Cottonwood, and the several mines of the old Flint company, and Mr. Leech's mines at Flint, the output of rich ore can be made very large, and it is hoped that this experiment will prevent them remaining idle, waiting for a railroad and smelter.

LOWER CALIFORNIA.

NOTES FROM ALAMO.—*Lower Californian*, Dec. 18: No special developments have been made in Alamo during the past week. More strangers than usual are in town and one or two deals are rumored. The mills now running are the Princessa, Aurora, Col. Lane's and the Montezuma. The Princessa mine is surprising everybody with its richness and promise. A new vein, or rather spur, was found within the limits of the Princessa's ground last week. The new find is about 10 inches wide and very rich. The Ulises is not far behind the Princessa. Its ore is not so rich, but there is a great quantity in sight. It is worked night and day, while its neighbor, the Indian, employs only a day shift. The latter is a small ledge, but rich, and its limits are abundant in stringers and spurs of great richness. The Aurora hoisting works are ready for the machinery which is now being put in, and another whistle will soon be added to the chorus. President Russell is running things alone for awhile. Mr. Rhodes having returned to Los Angeles to spend Christmas. The Scorpion mine, which was bought a few weeks ago by a Los Angeles syndicate, will be started up at once under the management of Frank Phelps, who has engaged a number of men to work. The ore will be milled by the Manzanita Co., which is thought to be interested in the mine. The Rainbow looks promising under the management of F. D. Mason. W. T. Vaughan, the merchant, is interested in the Rainbow. This mine lately milled 150 tons of high-grade ore in the El Paso mill. C. W. Steward still plugs away at the Arabelle, although almost everybody has abandoned Tomasa mountain as dubious. The Tarantula is worked occasionally by the owners. Several prospectors have started out since the last rain and more are ready when the rainy season fairly sets in. The general opinion is that rich mineral ground will be found to the south. Judge Zazueta and C. D. Lozano have a placer scheme which they will start this week. They will put in a string of sluice-boxes in a gulch at the foot of the Hogback range that divides Alamo from Mexican gulch. The Sheldon Bros. milled a lot of ore last week from the Sunrise which ran \$40 per ton. They have shifts now at work and are going right ahead. The Telemaco will start up this week. The El Paso mill started up Sunday on custom ore. J. Hendershot is taking out ore from the A. H. Butler which runs \$40 per ton.

A RICH SILVER MINE.—Tia Juana is at present considerably worked up over the prospect of the working of a silver mine which lies about 15 miles directly south of that place. The mine is not a new one, but the present development of high-grade ore is unexpected. Some years ago the mine was first talked of, but no paying ore was struck and but little work was done on it. Two years later a prominent mine-owner and prospector from Colorado came here and thought the mine was a good one. He secured a bond on it for \$50,000 and it is understood paid something on this, but died before having a chance to develop the property. Since then the claims have been in litigation in the Mexican courts and some of the natives of that country, living at Tia Juana, have secured a half interest in it. Some little time ago the American who owns the other half interest came here, a man by the name of Smith, and has since then been making careful investigations. He claims wonderful things for his mine. A few days ago he showed a piece of ruby silver, nearly as large as a half-bushel basket, which would run over \$10,000 a ton, and other specimens have also been taken from the mine which run over \$200 a ton. Mr. Smith says that there is a large body of this high-grade ore in sight and that there are now 5000 sacks of it ready for shipment which will run over \$200 to the ton. Mr. Smith is now considering the project of erecting smelting and reduction works at Tia Juana, where it is said the Mexicans interested insist they shall be located.

ALAMO NEWS.—*Lower Californian*, Dec. 25: The camp was never on a more solid basis than now. All the leading mines have been equipped for winter and the rainy season will have to be much heavier than usual to retard operations. The Aurora hoisting works and ore dump are almost finished and are very conveniently arranged. The non-arrival of the Aurora's hoisting machinery and boiler, which are now in Ensenada, have necessitated shutting down the mine and it will not be started up until after the holidays. The Princessa has been compelled to lie idle for almost a week, on account of the capers of the expert blacksmith. The rock in the Princessa is very hard and a blacksmith must understand his business to keep the drills in order. The Ulises, Indian and San David are being regularly worked and all look favorable. Robert Matheson and Jack Lee returned last week from Valladares, where they report the prospects as very good, but not such as to encourage any immigration. They will return shortly. H. S. Sherard is taking hold of the Butler mines and will see what they are worth. The Scorpion is being worked under Frank Phelps. Basilio Padilla, the discoverer of Mexican gulch, is placing there. All the placer men want rain, but otherwise the present weather suits everybody. Col. Lane is getting all the custom ore he can handle. The El Paso is also running on custom rock. The Princessa mill is steadily grinding. J. M. Albright has gone to San Francisco after a 5-inch

Cameron pump to be used on the Montezuma mine, work on which has been stopped on account of water. The shaft on the Montezuma is 40 feet deep and some of the ore that has been taken out is very fine, that from the level on the west side being especially rich and showing free gold. After the pump arrives the shaft will be deepened to 90 feet. A day shift of ten men has been working the Montezuma and they kept the mill supplied with ore.

NEW MEXICO.

PIÑOS ALTOS.—Rio Grande *Republican*, Dec. 27: T. Rouault returned this week from a visit to the mining property near Piños Altos in which he is interested. We understand that Mr. Rouault and Prof. Carrera are loading about seven cars per week with the product of their mine and as soon as more teams can be had will quadruple the shipment. Judging from the number of capitalists in town, we will have a mining or a land boom. We predict both, on the ground that our lands and mines are both rich, and well worth having.

RICH LEAD ORE.—The southern portion of the Organ Mountain Mining District is attracting considerable interest on account of the Herd Bros. striking a big body of ore in the Modoc mine, which will run sixty per cent in lead and not less than ten ounces in silver.

DEVELOPMENTS.—Silver City *Enterprise*, Dec. 25: I can be truly said that the Good Luck mine at Lone Mountain has been from its discovery to date one of the most phenomenal of the many promising prospects ever discovered or opened in this rich mineral-bearing area. The proposition has not only been a paying one from its very inception, but every shovelful of ore has not only been tinged with a dividend but has shown in the footings a tangible result in dividends which have stimulated the owners, Beall & Brockman, to extend developments; in fact the entire camp is solid in mining and financial circles as one of the most inviting silver fields on the continent.

SHAKESPEARE.—Shakespeare is still on the go. The company owning the Alwood mine is erecting a mill on their property, and will soon have a large force of miners at work. They will soon begin boring for water and expect to get sufficient for all uses without much trouble. The Humboldt Co. has been having some trouble, but the matter appears to be settled and the mill is running right along. At the present writing there are between 50 and 75 men at work in and about the camp, with splendid prospects of a large increase in the near future. At Pyramid the Viola Co. is working some 30 men and taking out very good looking ore. They do not intend to start their twenty-stamp mill until they can do so on their own ore. The Last Chance has been leased by Roberts & Leahy and Mr. Bradford, and though not doing much at this time it is understood they will start up soon. Gold Hill is once more in the dumps. The 10-stamp mill is again closed and it is uncertain when it will start up again, though the statement has been made that after the first of the year there will be a new departure and that finances will be forthcoming with which to demonstrate whether there is anything to be made out of it or not.

OREGON.

PROSPEROUS CAMPS.—Baker City *Bedrock*, Dec. 27: Reports from Cornucopia indicate that that camp is in a more prosperous condition than ever known before since its discovery. Extensive mining development work is going on and high grade bodies of ore are being uncovered. Sparta camp has taken on a mining activity that is simply wonderful, and all things indicate that Sparta will make her mark in the near future as a bullion-producer.

GREENHORN DISTRICT.—G. W. Chenoweth, a mine-owner in the Greenhorn district, gives a glowing account of the mines in that section and is of the firm opinion that next year will work an era of progress in mines and mining in this county which will be nothing less than a veritable revolution. He reports development work progressing nicely and the various properties showing up well.

UTAH.

DEEP CREEK ORE.—Salt Lake *Tribune*, Dec. 29: H. J. Faust and Sam Gilson have a splendid display of Deep Creek ore on exhibition at the office of the Salt Lake Abstract, Guaranty & Trust Co. They represent a large scope of mineral-bearing country, and include the Clifton district, the Kinsley, Dolly Varden, White Horse, Furber, Cherry Creek, Duck Creek, Pleasant Valley and Fish Spring districts. The collection will be added to as received. The ores are all rich, and only await the advent of a railroad to be turned into the channels of trade.

SILVER MOON.—A reporter called on the president of the Tintic Mining and Milling Co. this morning and was shown three millruns on Silver Moon ore that are very encouraging. The first from 13,524 pounds of ore went 4 per cent lead, 86.3 ounces silver and .13 ounces gold. The second lot, 14,450 pounds, gave 8 per cent lead, 67 ounces silver and .13 ounces gold; while the third lot, consisting of 16,235 pounds, assayed 18 ounces in silver and .10 ounces gold. The last lot was sent in as an experiment, and consisted of low grade that had been thrown over the dump. These tests were made from ore from virgin ground and were taken from the grass roots. The company will put two shifts of men at work immediately. They have a fine piece of property and will ship from the start.

PARK CITY NOTES.—About 1300 men are employed in the different mines and mills in the Park, and the average daily pay of each is \$3.25. Smith Ehrenreger has just completed a large amount of assessment work on the Dohlberg group for 1890. The Crescent Co. is holding on to its concentrates for a better market. There are 650 tons stored at the concentrator. The Woodside is being worked in both the old and new workings. In the old workings a drift is being run on the vein and ore is being taken out. A drift from the shaft is being run to intercept this one and it is now in 500 feet. The outlook at the Woodside is splendid.

THE SILVER MOON BOUGHT.—Salt Lake *Tribune*, Dec. 27: The Silver Moon mine has been purchased by the Tintic M. and M. Company. The price paid was \$58,000. This with the other mines the company has will give them an ample opportunity of spending some money and making some. A recent test was made of ore taken from the fifty-foot

shaft and was very satisfactory. On 16,235 pounds of argentiferous iron ore the following result was obtained: Silver, 18.4, gold, 1.10. On 14,160 pounds: Silver, 67 ounces, 8 per cent lead, 13-100 ounces gold. On 13,524 pounds ore: 86 ounces silver, 3 1/4 per cent lead, and 13-100 ounces gold.

A BIG DEAL.—A big mining deal is on the tapis in this city. It is being kept quiet just now, but will be a corker when it is let loose.

ORE AND BULLION.—McCormick & Co. yesterday received, Hanauer bullion, \$6800; silver and lead ores, \$5450, total, \$12,250.

GOLD BAR FROM BINGHAM.—T. A. Snell, manager Stewart No. 2 at Bingham, brought in a gold bar yesterday worth from \$500 to \$600. He says there is \$150,000 in gold ore blocked out and ready to break down and ship, and also that the mine has lots of ore that will run from an ounce and a half in gold to five ounces and ten ounces in silver.

WASHINGTON.

THE EAGLE.—Colville *News*, Dec. 25: The passenger on the Spokane Falls & Northern will notice evidences at Chewelah of the untold riches lying underneath the ground in this section, and especially around that particular point. He will notice trains or wagons loaded with ore that will run high in silver patiently awaiting turns at the box cars on the siding, which are being rapidly filled with ore for shipment to Tacoma and other points. Most of this ore comes from the Eagle mine, which is one of the richest and the best developed mines in that district. Regarding this property, a gentleman in this city received a private letter from Supt. Harris, in which he says: "We are sinking a new shaft 250 feet deep, double compartments with cases, and adding new hoisting works. The company has expended about \$45,000 under the grass roots, and everything found has proved that the deeper we go the richer the property becomes. We have just completed a new lodging-house, and are furnishing the miners with beds and bed sets with spring mattresses. From present indications the Eagle will rank well with the best paying mines in the country."

THE WELLINGTON.—W. H. Kearney left yesterday to put a force of men at work on the Wellington, a chloride of silver property on Mineral Hill in the Summit district. The prospect is only four miles from the Daisy and carries a like character of ore as this well-known property. Kearney hopes to make such developments during the winter as will demonstrate the property to be one of considerable value.

THE CROWN POINT.—Oscar Runnels is having development work done on this property which lies in the Trail Creek country. Assays made of the ore run as high as \$250 in gold and silver.

OLD DOMINION continues to look very promising. The ore found in the tunnel is of the same rich class as that above in the shafts and drifts. The tunnel will strike the main shaft 400 feet below the old works. In a few days the tunnel will be completed, and in the language of Supt. Kearney, "the mine will rival the Comstock."

DEAD MEDICINE.—John Keough was in town Tuesday and said he had just finished with the assessment work on this property. The ore is iron and galena. The tunnel is in about 40 feet and only a few feet farther must be gone before the main ledge is reached. The tunnel will strike the shaft 250 feet below the surface.

THE DAISY.—The upper tunnel of this property is 120 feet, from which a shaft is sunk 64 feet, and a raise to the surface made. The Robinson or middle tunnel is 230 feet, which connects with the bottom of shaft. The lower level is 384 feet long, from which a raise is made of 150 feet to the bottom of the old shaft. The lower tunnel cuts the ledge for 150 feet. The main shaft will be 265 feet deep. Over 540 tons of ore have been shipped from a 120-foot stope. There is now ready for stoping 190 feet, which will yield about 750 tons of good shipping ore.

NORTH EXTENSION OF DAISY.—This promising prospect is owned by Joe Horton. A run in has been made of about 25 feet and a 3-foot vein struck, though its position shows it not to be the main ledge which is of the same character and pitch as the Daisy. The ore taken from the vein assays 30 ounces in silver.

SILVER WAVE.—The shaft on this property is at present about 100 feet down. The ore is galena, and the more work is done the more extensive becomes the amount of ore.

THE BONAZA.—Shipping goes regularly on from this property. Cars are left at the siding near the property. The ore goes to Kansas City.

NEW STRIKE.—This property is located on the north fork of Kettle river, and is owned by a Seattle stock company. R. A. Brown, superintendent, was down Tuesday purchasing the last load of supplies for the winter. He is working a full force, and by spring will have the mine in a condition to ship an abundance of high-grade silver ore. Supt. Brown says he will probably be down in March with about \$7000 worth of furs. He is buying for a New York firm.

LEDGE MATTER.—Okanogan *Outlook*, Dec. 27: Billy Hunt and Bob Hargrove are doing some development work on the Eureka on Mineral hill. While doing assessment work on the Orphan Boy last week a fine chute of ore was encountered in the face of the tunnel. James Malone, who was doing the work, notified his partner, Mr. C. F. Grismer, of Tacoma, of the strike, and it is likely further prospecting will be done. The law compelling miners and prospectors to do \$200 worth of work annually, in order to hold mining claims is being pretty generally complied with in this district, this year. Those who are in a position to know say that there are few, if any claims, where the indications would seem to justify, where the proper and required work has not been done, and the claim-jumper will doubtless find his business largely curtailed during the coming winter. Ed. Harvey and H. F. Miller finished assessment work on the Green Horn last Wednesday for Mr. Hinds. In running an open cut about six feet deep across the surface of the ledge they uncovered a pay streak two feet and a half thick of splendid looking ore, and taking into consideration that the width of the ledge as exposed by this crosscut is over 22 feet, it must be admitted that the top showing is an unusually good one, and the general conditions of the formation and character of the ledge matter would seem to indicate a true fissure vein and a permanent ore chute.

MECHANICAL PROGRESS

The Origin of Iron.

The following very interesting discussion on the history and origin of iron was recently published in the London *Mechanical World*:

In treating of the origin of iron, we are not dealing with a complex mineral or other substance which has been evolved out of simpler compounds, and ultimately from its elements, but with an element itself, if we except the impurities which are inseparable from commercial iron. All the same, we hope to show that throughout its geological as well as its metallurgical history, iron has passed through processes of evolution which, if not exactly analogous to that which obtains in plants or animals, is not necessarily devoid of scientific interest.

The latter stages in the production of malleable iron, the rolling-mill, the forge, the puddling furnace and the blast furnace, are well known and understood by readers of this journal. It is when the ore is reached and the geological history of iron has to be traced that the real difficulty begins.

Before dismissing the metallurgical side of the question, a word is due to the curious change which advancing knowledge has worked on the locale of iron manufacturing in our own country. One of the greatest steps in this onward march was the substitution of coal for charcoal in the smelting of the ore. The result of this discovery was that instead of continuing to be carried on in the wooded districts of the southeast of England, iron manufacturing was transferred to the coal-bearing districts of the country, where it has remained ever since.

Passing from the metallurgical side of the question, the first thing that has to be considered on the geological side is the iron, or ironstones. Iron is not only the most useful of materials, but, under one form or another, the most widely distributed.

In all geological formations, it is found both in sedimentary and igneous deposits. It is also found in plants and animals, as well as in water, both sea and fresh. It is only, however, when the proportion of iron exceeds 16 per cent or thereabout that the material is considered an ore of iron, or ironstone. In the great bulk of ores the metal exists in chemical union with sulphur, oxygen or carbonic acid, and while Nordenskjöld describes the occurrence of metallic or native iron in some volcanic deposits in Greenland, the presence of metallic iron, when found in the earth, is usually attributed to meteoric sources.

Iron ores are found as sedimentary deposits, and also as masses and veins. The British deposits, so far as at present worked, belong to the carboniferous age, with the exception of the extensive clay-band deposit of Cleveland, which belongs to a later period, and all are included under the division sedimentary or deposited by water. The deposits known as masses are met with in Scandinavia, Styria and other parts of the Continent, and there are also many examples of this sort in the United States. Masses along with veins or lodes are considered due to the action of heat, and are termed igneous as opposed to sedimentary, and they have been ejected from below instead of laid down from above. Putting all iron deposits under the broad classification of sedimentary and igneous, attention will first be directed to the former of the two.

Sedimentary deposits having been laid down by water, it follows that the water must have obtained its supply from previously existing ferruginous rocks. That many of the pliocene rocks contain iron compounds may be easily proved by examining the exposed sections of the trap rocks, which are scattered up and down the country. While a fresh fracture of these rocks shows the interior to be dull gray or black, the weathered surfaces are often found to be of a rich brown color. This is due to the action of rain and atmospheric agencies washing out the soluble constituents, such as lime, potash, etc., setting free the oxide of iron, which gives the characteristic coloring to the exposed or weathered surfaces. The probability, therefore, is that the sedimentary deposits of iron ore have been derived from the denudation of earlier rocks. The silica of these earlier rocks would be then deposited in one place to form sandstone, aluminium-silicate, in another place to form clay or shale, while the iron, in accordance with its specific gravity, would also be deposited by itself in beds of greater or lesser magnitude, according to the time the process went on. These beds would subsequently become subjected to the pressure of overlying strata, and according as they would be affected by other phenomena, such as heat, infiltration, etc., some of the characteristics would be stamped upon the deposits which are known to distinguish them to-day.

It will now be noticed that this theory of the formation of sedimentary beds allows of the two classes of deposits—so far as further investigation is concerned—being merged into one, and that is the igneous.

To affirm that all the world's iron has been derived from igneous rock is to say that, in one way or another, it has been ejected from the earth's interior, or from some source deep down in the earth's crust. Though circumstances prevent this from being openly demonstrated, there is strong circumstantial evidence

which points to this conclusion, some of which will be briefly noticed.

From several independent observations and calculations, it has been found that the specific gravity of the earth as a whole is about 5.5, while the average of rocks at the surface is rather under half this amount. Some have argued that the increased specific gravity is obtained by excess of pressure, but this view is not generally accepted. From the abundance of iron compounds in the crust, and its apparent derivation from the igneous rocks, together with the suitability of its specific gravity (7.70) for balancing up the deficiency in the surface rocks, it has been argued that an immense store of metallic iron exists in the earth at a certain depth not exactly determined.

The action of the dipping needle, which is always accentuated by an approach to the polar regions, where, presumably, the so-called crust of the earth is thinner, has also been cited as supporting the theory of an internal mass of iron. In the excellent paper by Prof. Rucker on "Underground Mountains," which appeared recently in one of the popular monthlies, allusion was made to the action of deep igneous rocks on the dipping needle as exhibited on the Thames valley. This action was ascribed to the metalliferous nature of these rocks, and as these rocks must have come from below, they may be fairly held as supporting the theory of an internal mass. It might further be pointed out that in the meteorites which occasionally visit our planet, a common constituent is metallic iron, often so pure as to admit of its taking on a brilliant polish. Seeing, then, that metallic iron exists in some extra-terrestrial sphere, which gives rise to our meteoric visitants, there is surely no reason why it should not exist in this state on the earth, and seeing it is not found at or near the surface in this condition (metallic or native), the only other place it can be is deeper down, or, in point of fact, in an internal mass.

Assuming that some evidence has now been adduced to indicate where the world's real iron store exists, a difficulty is encountered in following its passage from the metallic condition to its various forms of combination as found by man. Knowing the readiness of iron to combine with oxygen, sulphur and other elements, about as much as one can do is to imagine varying degrees of temperature and pressure, together with eruptive action, and a long draft on the bank of time to account for the various forms of ores and stones in which iron is now found.

The subject may be further pursued and the question asked, "Whence has the earth all this iron?" Seeing that iron forms such a large proportion of the earth's mass, the answer to this involves the question of the origin of the globe itself.

Hypothesis has been said to be the life of investigation, and so it is now affirmed by the highest authorities that the earth, and consequently its iron, at one time formed part of the sun. In using the term sun it is understood that not only is the sun nucleus meant, but also the deep covering of incandescent vapors which surround it, and which, for convenience, may here be termed its atmosphere.

The labors of Kirchhoff and Bunsen, with the spectroscopes, have revealed in the sun no fewer than 25 elements, all of which are known among things terrestrial, and there is every reason to believe that the remaining elements either existed at a former period, or exist now, in the sun. Among the metals discovered in the sun's atmosphere is iron, and, in consequence of the enormous heat, it, along with the other metals, is in a state of vapor.

Not only is the presence of iron unmistakably made out, but its position among other metals is just where it might be expected, having respect to gravity and the atomic weights which these metals are known to possess on the earth. The study of other metals in the sun, as revealed by the spectroscopes, goes far to support the hypothesis of the earth's solar system, but is beyond the scope of the present paper.

The subject of iron must ever be an important one in a country whose prosperity depends so much upon it, and the various metamorphoses through which it passes before it can form a part of a mechanical structure, should be of interest to every one who wishes for the continuance of our commercial prosperity.

A GREAT FEAT IN METAL WORKING, according to the *American Manufacturer*, was recently accomplished at the Saperior mill in Allegheny, Pa. The feat consists of rolling a strip of steel for a spring six inches wide, one-quarter of an inch thick and 310 feet long. This work was successfully performed and the spring properly tempered at the first effort. That establishment has since received a large order for such springs, which are designed to enter into the construction of a new car motor, for which a great demand is anticipated. The order had previously been tendered to all the large English and continental works of Europe, none of which would undertake to do it.

AN IMPROVED BUNSEN BURNER.—Carl Meissner, Leipzig, says the *Gas World*, makes a new patent form of Bunsen burner. The tube of it can be screwed up or down. When it is well down, nothing goes up except gas from a conical nozzle. When it is high up, a good deal of air goes up with the gas; and thus the flame can be regulated. The aperture at the top is not round, as usual, but star-shaped; and thus the flame can be lowered to a very small size without striking back.

SCIENTIFIC PROGRESS.

The Language of Monkeys.

Prof. R. L. Garner, honorary curator of the Smithsonian Institute of Washington, is engaged in a very interesting inquiry in regard to the language of monkeys. Do they have a language, and can it be interpreted as to be understood by man? He describes his object and method of inquiry as follows:

"My purpose in the experiments I am making is to obtain an analysis of the language of monkeys that will enable me to make out some sort of rude vocabulary of their tongue. This accomplished, I am sure that I can establish communication by words with them, so as to effect an interchange of ideas. In fact, I can see no reason why a man and a monkey should not eventually converse together, the one requisite being that the man shall be acquainted with the monkey's speech. The latter is exceedingly simple, and the key to it once obtained, most easily learned. It can hardly be expected of the monkey that he shall acquire human language.

"It is with a view to getting hold of this key to the simian tongue that I am taking advantage of every opportunity to procure records on phonograph cylinders of sounds uttered by monkeys. I find on all sides a most cordial sympathy with the inquiry I am making in this new line of scientific investigation. The idea is entirely original with myself, but my belief is that the study of the languages of the lower animals is a field that will before very long attract an army of workers.

"Already I can make a capuchin monkey understand two words wherever I may meet him. One of these words is 'milk' and is uttered by all of them, so far as I have been able to discover, in precisely the same way. On approaching any strange capuchin for the first time I salute him with the term, which invariably procures his attention and good-will. The word in question, however, belongs only to that one species. For you must understand that different varieties of monkeys employ vastly different languages, the speech of one variety being as little known to another as is the case among tribes of men. So far as I can find out, none of the lower animals has a range of more than ten or twelve vocal sounds, but these, being simply interjectional, may be so modified by enunciation as to make nouns and verbs. Apparently the monkey has forty or fifty words effectively at his command.

"I find that I can communicate to the capuchin the fact that I am in pain, and can make a slok capuchin understand my sympathies with his suffering. It is almost impossible to give in printed letters illustrations of the vocal sounds of monkeys, inasmuch as they are nearly all vowels. It can be said, however, that the sounds are strikingly like those uttered by human beings as the expressions of similar emotions. The vocal organs in the lower animals are comparatively rudimentary, but development follows use and effort. All the words that a monkey needs he has at his command. Incidentally to the modern advancement of the human race, thousands of words have been added to our own speech which were not needed by our early progenitors. You will find certain tribes of men described by the Greek writer Strabo who 'had no language, but shrieked like wild beasts,' only uttering very few sounds.

"As for paleolithic man of hundreds of thousands of years ago, there are many scientific authorities who assert that he was actually a dumb creature—as dumb, that is to say, as the monkey is now. It is readily observed that those animals which have been associated with man for many generations are capable of producing many more vocal sounds than others of like species which have not enjoyed the same advantage. For example, the domestic cat is decidedly superior in this respect to any other beast of the feline genus. The reason for this is found in the change of environment and association with multiplied ideas, increased wants, etc.

"Low down in the scale of animal creation you discover that signs are altogether employed as a means of communication. This is exemplified by insects, fish and reptiles. Among other things, they readily understand any threat of attack made by their own species. I myself have noticed that common red ants make use among themselves of signs which they readily interpret.

"I am unable to say with any degree of certainty what variety of monkey is the most intelligent, but I am inclined to think—though this belief, founded upon observation, is greatly at variance with the popular idea—that the most intelligent specimens are found among the smaller species and generally among those with tails instead of otherwise. My study of the chimpanzee disposes me to surmise that its intelligence less closely resembles that of man than is the case with some of the smaller monkeys.

"It was only recently that the idea of using the phonograph to obtain records of monkey vocal sounds for study occurred to me. Through its aid I hope to be able within a year to go a long way toward making out a vocabulary or simian language, which will serve as a beginning in establishing intercommunication. You must not imagine that I propose to demonstrate the possibility of converting the monkey into a man. The monkey will always remain a mon-

key, but it may be that, by long-continued breeding and educating, a race of monkeys very far superior to any at present existing can be produced. When a means of conversing with the monkey has been secured, it will be time enough to think of the intellectual and moral development of our arboreal cousins."

A PEEP AT THE SECRETS OF LIFE.—One of the most interesting objects for examination under the microscope is *Valineria spiralis* (the grass which grows in aquariums) when prepared to show cyclosis or circulation of the protoplasm. Prof. Lookwood in the *Microscope*, says: "I think that, to the amateur at least, a hint how to observe the circulation of this favorite plant to the best advantage must be acceptable. I have never seen it better displayed than when under the excellent manipulation of Mr. F. W. Devoe of the New York Microscopical Society. Having selected a bit of leaf, not too mature, he shaves off one side with a sharp knife, although a razor is better. It is then put on a slide, the shaven side up. A drop or two of clean water and a cover glass of medium thickness, with good illumination, follows, Mr. Devoe using a prism illuminator. Begin the examination with a six-tenth inch objective, and continue up to a sixth or a tenth. The result will be a vision of startling clearness. The vivid individuality of each bioplasmic molecule, and the mystic, almost solemn movement of this pellucid stream of infinities of life, form a sensational picture of which the beholder never tires."

AN INTERESTING EXPERIMENT WITH A LUBRICANT.—The experiment referred to was undertaken by G. W. Bissell for the purpose of determining the variation of the coefficient of friction of a lubricant, the rate of feed of the same to the journal being varied and all other conditions constant. The temperature was maintained constant by circulation of water through the brasses of the Thurston railroad-lubricant testing machine, which was used in the experiments. Tests were made with loads of 2000, 3000 and 4000 pounds on the journal, corresponding to about 70, 105 and 140 pounds per square inch. The results indicate that with low rates of feed the effect of pressure on the coefficient of friction is practically nil, which would tend to prove that under such conditions lubricating rubbing surfaces follow the laws of solid or "immediate" friction; but at the rate at which this state of affairs begins to be apparent, the augmentation of the coefficient is dangerous to the continuance of the smooth running of the journal. It is unsafe to reduce the rate of feed below .003 c. o. per square inch of projected area of journal per minute.

PLANTS AS REAGENTS.—From the results given it appears that by means of beer yeast it is possible to recognize the presence of 0.0005 gm. of phosphate in one liter of water, which corresponds to 5-10,000ths of the weight of the liquid. But agricultural plants are also reagents of an extreme delicacy and accuracy. The author gives as an example the sugar cane, the dominant food of which is calcium phosphate. With the complete manure the cane gives a harvest of 57,000 kilos. per hectare. If we omit the phosphate, the yield is only 15,000 kilos. Hence 600 kilos. superphosphate, containing 90 kilos. phosphoric acid, determine an excess of crop of 42,000 kilos. per hectare, which represents 70 times the weight of the phosphate and 466 times the weight of the phosphoric acid. If referred to the 4,000,000 kilos of vegetable soil covering the surface of a hectare, the phosphate represents less than 1-6,000 part of the weight of the soil and the phosphoric acid less than one forty thousandth. The author, George Ville, hopes to fix the limits of this method.

AN AUTOMATIC ELECTROMETER.—The Meteorological Observatory of the Massachusetts Agricultural College has recently received a delicate apparatus for keeping a continuous record of electric potential of the atmosphere. It consists of an automatic electrometer, the ordinary water-drop apparatus for picking up the air potential, and a photographic registering apparatus. This consists of a cylinder operated by clockwork and carrying the sensitive paper on which a spot of light is focused from the mirror of the electrometer. The arrangement enables a perfectly continuous record of the potential variations in the atmosphere to be kept.

THE WONDERS OF NATURE.—Certain worms similar to the tubific multiply by producing new parts. There is one form, known by the quaint name of Nais, which will develop in the midst of its own body a second head, and just in front of the new head a second tail. Thus there come to be, as it were, two worms joined together; the front one has the old head and a new tail, the hind one a new head and the old tail. By and by the companions separate, and the parent body is thus transformed into two complete animals.

ANOTHER ELEVATED ASTRONOMICAL STATION. An important astronomical expedition has just been sent out by Prof. Pickering from the Harvard Astronomical Observatory. The party will go to Peru to observe and photograph the stars and determine their relative brightness. A new station will be founded near Arequipa, Peru, about 8000 feet above the sea level.

USEFUL INFORMATION.

WIRE NAILS FROM STEEL PLATE.—A Pittsburgh iron and nail manufacturing concern has fitted up an attachment to its steel-plate nail-mill, by which it is claimed wire nails can easily be made. Hitherto this has been regarded as impossible, but a reporter of the *Western Manufacturer*, who witnessed the operation of the new device, was enlightened as to the process, and thus describes it: One of the long row of nail-plate machines, out of scores now standing idle, has been fitted with the new arrangement. The self-feeder has been removed, and in its place is substituted an ordinary wire-nail machine feed, operating from the left side. The head-plate, gripping and heading die remain as in the old machine, but from the clamp at the back is attached an arrangement for cutting and pointing the wire, similar to the manner in which this process is done in regular wire-nail machines. It is said the adapted machine turns out perfectly formed nails at the rate of 250 a minute; that the heading die performs its work better than that of the regular wire-nail machine. The heading arrangement of the latter works from above, and fashions the heads with a quick blow. The heading die of the transformed nail-plate machine works from the right-hand side, and works the heads with a more gradual motion. The nails are seemingly thoroughly well made, well pointed, and with large heads, and without any indication of splitting. By changing the space block, 4, 6, 8 and 10-penny sizes can be made. The alteration of the plate-nail machine to the wire-nail producing form is quite simple and can be done in 30 minutes, and its capacity for wire nails is said to be from 40 to 50 per cent greater than the ordinary wire-nail machine.

A RUSSIAN FIRE-PROOF PASTE.—Still another process for fire-proofing combustible materials is reported as having made its appearance, this time in Russia. The medium is described as a paste, the invention of a poor school-teacher, and is said to have been tested recently with most gratifying results by the Moscow Imperial Society of Agriculture. A shanty was built entirely of straw, and after being covered with the paste, was subjected to a hot fire, when the straw merely changed from a yellow to a reddish-brown color without igniting or even cracking. The Imperial Society has, it is stated, decided to introduce the use of this new invention throughout the empire, considering that it will prove of the highest value in villages where the houses are, as a rule, thatched with straw, and where fires once started, frequently make a clean sweep of the place. The cost of the preparation is spoken of as being very small, and should this youngest-born protector against the flames prove to be all that is claimed for it, it will deservedly take rank as a most useful invention, but the experience of Americans with the dozens of so-called fire-proofing liquids and processes for fire-proofing wood which have been advertised and hawked about within the last generation or two does tend to make them rather skeptical about the true inwardness of such tests as that described.—*Fire and Water*.

KEEPING WALLS DRY.—In a recent issue of the *London Architect*, W. L. Dearborn explains Sylvester's process for keeping walls dry. It consists in using two washes or solutions for covering the surface of the walls—one composed of castile soap and water and one of alum and water. The proportions are three-quarters of a pound of soap to one gallon of water, and half a pound of alum to four gallons of water, both substances to be perfectly dissolved in water before being used. The walls should be perfectly clean and dry, and the temperature of the hot air not above 50 degrees Fahr., when the compositions are applied. The first, or soap wash, should be laid on when boiling hot, with a flat brush, taking care to form a froth on the brickwork. This wash should remain 24 hours so as to become dry and hard before the second, or alum wash, is applied, which should be done in the same manner as the first. The temperature of this wash when applied may be 60 or 70 degrees Fahr., and this also should remain 24 hours before a second coat of the soap wash is put on. These coats are to be applied alternately until the walls are made impervious to water. The alum and soap thus combined form an insoluble compound, filling the pores of the masonry, and entirely preventing the water from entering the walls.

A FIREMAN'S ELECTRIC HAND-LAMP is being introduced in England. The battery and lamp are contained in a copper case similar to a fireman's ordinary lamp and fitted with a handle for convenience in carrying. Very powerful parabolic reflectors are provided, and the lamp, which has a duration of from two to three hours, after which it can be easily recharged, forms an important adjunct to the outfit of the fire brigade. The lamp is also suitable for use in mines, gas works, gunpowder and chemical factories. The advantages claimed for it are portability, facility in charging, capability of resting the battery when the light is not required, and extreme safety.

THE LABOR PROBLEM IN ENGLAND.—The London Chamber of Commerce has proceeded in an extensive way to deal with the labor

problem. A conciliatory board, consisting of 24 members, is to be appointed and afterward kept up by election. The members are to be one-half selected by the employing interest and the other half by the employed. A long code of rules for procedure has been drawn up and the chances are that if perfected, this scheme will result in a still more extensive "court" of a permanent kind founded under acts of Parliament. This, at last, looks like some light on a problem that must soon be dealt with in some way there and elsewhere.

SHOP NOTES.

NEW STYLE OF FLY-WHEELS.—A novel fly-wheel of large dimensions, which differs materially in construction from those ordinarily in use, has been designed by Messrs. Mannesmann, to guard against the terrible danger of bursting, to which accident cast-iron fly-wheels are only too subject when worked at a high speed. This wheel, which is in operation at the Mannesmann Tube Co.'s works, in connection with their process for making seamless tubes, consists of a cast-iron hub, to which are securely bolted two disks of steel plates, about 20 feet in diameter. Round the periphery of the wheel thus formed, about 70 tons of No. 5 gauge wire are wound, under a tension of about 50 pounds, thus binding the whole securely together. There can be no comparison between the resistance of a wheel so constructed to the centrifugal force and that offered to this force by a cast-iron one. This fly-wheel of 20 feet diameter and weighing 70 tons, revolves 240 times per minute, therefore the periphery of the wheel has a speed of 2.85 miles per minute, or nearly three times the speed of the Flying Dutchman. It works on the main shaft from which the tube mill is driven by means of helical toothed steel wheels.—*Specialties*.

WINDING WIRE SPRINGS.—In winding an open spring of wire all that can be calculated on its reflex force after being "shut," or compressed, are the elements of material of the wire, temper of the wire, size of the wire and diameter of the coil. These calculations are easily made, or so nearly that any error may be easily rectified, if the spring should not prove yielding enough, by stretching its coils apart. But a close spring is a different matter. In this there should be more than a closeness of coil; it is requisite that the closing-up inclination of the coil should be greater than the opening resistance, in order to get the greatest power from the spring. This condition may be obtained by holding the winding wire back toward the winding end, even if the leader is "off" from the open end, if the wire is strong enough to sustain the tension, as the result will be an apparently open-wound spring, that is, a closely coiled spring as soon as the end is released. To increase the intensity of a spiral spring (close wound) the wire should be twisted in the winding, the direction of the twist being against the line of the pull on the wire.—*Scientific American*.

INCREASING THE WEIGHT OF TOOLS.—A few years ago there was considerable argument in favor of largely increasing the weight of machine tools, but little seems to have come of this argument. It is safe to say that nine out of ten machine tools on the market to-day are lighter than they should be for the best economy, but builders will go on building light, weak tools because they will sell. When it comes to putting \$50 more stock in a lathe, for example, the question of getting paid for the extra stock is, in these times of close competition, a very important one. When purchasers are willing to pay for heavy tools they will find builders willing to make them. But the demand must precede the supply. When it comes to getting hard work out of a machine tool, ten per cent extra cost does not amount to much, but when it is a question of selling a tool that costs ten per cent more than another, it is uphill business. The manufacturers of machine tools must look at the commercial side of the matter, to the exclusion of other considerations.—*American Machinist*.

HOW TO CLEAN GUMMY MACHINERY.—The simplest and most efficacious method of thoroughly cleaning the various parts of machinery that have become gummed and dirty by the use of fat oils, for lubricating purposes, is by using a strong soda lye. For each 1000 parts by weight of water take about 10 or 15 parts by weight of caustic soda or 100 parts ordinary soda. Let the solution boil and enter the parts to be cleaned; either boil them in this lye or let them steep in it for some time. All the dirt and oil resin is completely dissolved thereby, and it remains only to rinse and dry the parts. The action of the lye is such that it enters into combination with the oil and forms soap, which is readily soluble in water. In order to prevent the hardening of the lubricant on the machinery parts, it is only necessary to add about one-third kerosene. An occasional lubricating with kerosene alone is to be recommended.—*Glasgow Engineer*.

TO AVOID CALLOUS HANDS IN THE SHOP.—A writer in one of our exchanges says: The callousness of the hands of iron-workers may be avoided very easily. Take the average water pail, twelve quarts, fill with soft water five hours before quitting time, noon and night; add two ounces of borax, two ounces of

sulphate of soda. Lather the hands well with brown soap, and then fill the hands with white or any fine sand, and wash thoroughly in the borax water for five minutes or more. Beginning before the hands have become horny, once a day (at night), with one-fourth the chemicals, the smith's hands can always be kept in good, pliable condition, and joint cracks avoided.

ELECTRICITY.

A SINGULAR USE OF ELECTRICITY.—Perhaps one of the queerest applications of electricity to the useful arts is its employment in the hiving of bees when they swarm. The old-fashioned way of accomplishing this interesting feat of domestic economy was, if not absolutely dangerous, quite annoying and provoking. A German scientist, of a practical disposition, conceived the notion of utilizing the electric force to stupefy, without injuring, the bees for a short period. The plan was found to work like a charm. It was first tried upon bees that had gathered upon trees. Whether the cluster was large or small, the result was perfect. The bees fell upon the ground in a trance, which admitted of safe handling. The next stage in the experiment was to capture the bees when they were about to swarm. By introducing the ends of two conducting wires into a fully coupled honeycomb, and turning on a mild current for an instant, the insects were rendered inactive for about 30 minutes. Bee-raising and the production of honey are yearly becoming a greater industry in this country. Parties interested in the business should test the German method of hiving bees by electricity. They may apply too strong a current and lose their bees, but they will gain in science, which ameliorates all small disasters in this progressive age.

HOW AN ELECTRIC CAR IS MOVED.—The dynamo which generates the current does so by the revolution of a coil of wire near the poles of a magnet, the force which revolves the coil being derived from the engine. The current then passes over the wires, down the trolley which surmounts each car, to a small motor. This motor has an armature consisting of coils of wire traversed by an electrical current, which is attracted in succession to the poles of the stationary coils called the field magnets, through which the current also flows, flies around, and transmits its motion, by means of cogwheels, to the axle of the car. The driver of the car, by the use of a lever turns the current into the motor beneath the car or diverts it to the rails at will. In the conduit system the current passes along the wire, with which connection is made into the motor on the car, and then out through the wheels to the rails, and then back to the central dynamo.

WIRE AND ELECTRICITY.—Electrically heated flatirons are now made which are very serviceable. The flatiron is of the usual form, but made hollow. The interior contains a lot of coiled wires, through which the electrical current passes and heats the wires red hot. The latter are arranged between protecting sheets of mica and asbestos. You turn a switch, and the flatiron at once heats up ready for use. The street wires supply the electrical current. In the same way all kinds of domestic utensils may be heated, such as cake-bakers, meat-broilers, coffee-pots, etc. Electrical platters for keeping food warm when on the table may be had. Electrical heaters for warming apartments are also made. There is, indeed, no end to the useful applications of wire and electricity.

LOCAL INTERESTS IMPROVED BY ELECTRICITY.—Electricity is doing more for the country towns, says the *Pittsburg Dispatch*, than all other agencies combined. It is lighting villages that would otherwise be groping in the dark, for gas corporations do not settle in such places. The game is not big enough. But the greatest thing electricity is doing for the small towns is the running of the street cars. This has given them a forward impetus that has been of immense benefit to all of their business interests. A great deal of the vim and push seen in Western Pennsylvania towns is due to electricity.

ELECTRICITY VICTORIOUS.—The Paris Gas Company is said to be the first of the important European gas companies that shows a visible decline distinctly due to the increase of electric lighting. The decrease for August and September of the present year, as compared with the same months last year, is respectively eight and six per cent.

MAKING METALLIC WHEELS BY ELECTRICITY.—A patent has been granted to the Bettendorf Brothers, of Davenport, Iowa, for an improvement in the manufacture of metallic wheels, by which the spokes are welded to the hub and tires by means of an electric current passed through the parts during the welding operation.

FELLING TREES BY ELECTRICITY.—In the forests of Galicia an electrical tree-feller has been introduced with success. The saw is actuated by an electric motor, to which the current is conveyed by conducting wires from the nearest generating station.

THE TELEPHONE PATENT.—The English telephone monopoly has come to an end, as the English patents expired Dec. 9th. The Bell patents in this country have still three years to run.

GOOD HEALTH.

ELECTRIC PROSTRATION.—"Electric prostration" may be called a new disease. It troubles workers under electric light. Severe cases are reported from Creusot, France, where an electric furnace is used for quickly heating metals. The light exceeds 100,000-candle power, and the men suffer from it and not from the heat. After one or two hours the workers have a painful sensation in the throat, face and temples, the skin becomes copper red, and an eye irritation begins that lasts 48 hours, the discharge of tears being copious. After five days the skin peels off. Dark-colored glasses somewhat mitigate the effects of this tremendous light, but not entirely. *Per contra* to the above, it is said that electric-light men are never troubled with rheumatism, says a local paper. The stiff-jointed portion of humanity hover around the dynamos in the Brush Light Company's works just the same as consumptives seek a slaughter-house for the blood of a freshly-killed bullock. "Why, people would be hanging around our dynamos all day if we permitted it," said Superintendent Law. The discussion upon the subject of electricity as a curative agent in certain chronic cases, notably rheumatism, has excited much interest among electricians and classes of workmen engaged in handling heavily charged wires. Numerous cases are cited in different parts of the country to prove that men engaged in these employments are free from all rheumatic and neuralgic troubles.

CREAM AS A CURE.—Very few housekeepers know the value of cream as food, and its superiority over butter or any other solid fat by permitting the gastric juice to mix with it in the most perfect manner, and in this way aiding and hastening digestion. It is most invaluable in the case of invalids, for it serves as nutriment in the most readily available form. It is also superior to butter, because it contains more volatile oils than butter made from it. Persons consumptively inclined, those with feeble digestion, aged persons, and those inclined to chilliness and cold extremities, are especially benefited by a liberal use of sweet cream. No other article of food or medicine will give such satisfactory results. It is far better than cod-liver oil, and is an antidote against consumption and a nutritious food for any one at all times. It would probably be used very freely were it not for the impression that it is an expensive luxury, and for this reason we restrict ourselves in the use of cream, and use butter, a still more expensive luxury, lavishly. The impression seems to be that the legitimate end of cream is to make butter, while, in fact, butter-making is the least useful purpose for which milk is employed.

A RIVAL FOR DR. KOCH.—A telegram of December 25th states that a consumption cure introduced by Dr. Shirley of Detroit, is attracting much attention among physicians. Dr. Ingalls of Chicago has inoculated several patients with it. In a recent interview he said no immediate effects are noticed in this treatment, but Dr. Shirley has dismissed several of his Detroit patients apparently cured after four months. The remedy consists of hypodermic injections of a solution of chloride of gold and soda, or a solution of iodine. These drugs have long been used for consumption, but never in this way before. The cure is a blood cure and of course it takes some weeks to have any effect. The remedy is injected much as the Koch lymph is, but its nature and effect are very different. It is an alterative and does not, like lymph, attack and destroy the disease tissue. Its effect is to change the nutrition of the tissue and not destroy it. It is therefore much milder than lymph, and its use is attended with no languor.

ELECTRICITY FOR A FELON.—The capabilities of electricity as a remedial agent have just received a new illustration. A man with an aggravated case of bone felon on the thumb consulted a physician, and was told that several months would elapse before he could use his hand. In his dilemma, he sought the advice of a physician who had done some excellent work by means of electricity. The physician operated on the diseased member with an electric battery, and the pain, which had up to that time been intense, ceased. In four days the patient was at work again. The operation was a pronounced success, and a perfect cure was soon effected.

A NEW DISINFECTANT.—A London contemporary says: "Since we have learned to be terrified by the ubiquitous microbe, means for combating him have multiplied and flourished. The latest disinfectant is called 'lysol,' and appears to be our old friend carbolic acid emulsified, and thereby made more active. The emulsifying agent is an ordinary fat or resin soap, but the peculiarity of manufacture lies in the fact that the tar acid is incorporated with the soap at the moment of saponification. The customary proofs of efficacy are forthcoming, and duly chronicled in the German edition of the proceedings of the British Association, which have recently been issued at Bremen."

THE LYMPH NOT DANGEROUS.—Dr. Koch, in a recent conversation with the municipal authorities of Berlin, denied that his lymph was in the smallest degree dangerous to life, providing it was employed in reasonable quantities by skillful physicians.



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A. T. DEWEY. W. B. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday, January 3, 1891.

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Passing Events.

There are indications of a revival of interest in the mining region of the northwestern part of this State, where there is plenty of auriferous gravel as yet untouched. The surface placers are pretty well worked out in these days, but deposits suitable for drifting and hydraulicking are yet to be had. In fact, it looks as if blue gravel in extensive deposits will yet be mined.

The rain of this week was of great benefit to the State and appears to have been pretty general.

An electric road is shortly to be built in this city, another at Oakland, and the plant for another has arrived at Sacramento. In the Eastern cities these roads are quite common, although there is a general desire for a successful system which will do away with the overhead wires.

With this number of the PRESS we commence a new volume, and it is a good time for our friends to suggest to others that they shall become subscribers to the oldest mining paper in the United States.

A STATE MINE CONVENTION is being held at Cheyenne, Wyoming, and a display of minerals is being made.

Mineral Zone or Lode.

A very important mining suit is now in progress in Los Angeles, entitled Doe vs. the Waterloo Mining Co., or in reality, the Oriental and Red Cloud mines vs. the Silver King, in Calico district, San Bernardino Co. The suit involves the question of lode or mineralized zone as opposed to separate veins. A zone or mineral body exists in which are numbers of lodes or veins, and the suit is to determine whether these are separate and subject to separate location, or whether they simply form parts of one mineral zone. The occurrence is at the contact of a volcanic tuff and a trachyte or a liparite. The character of the ore is a heavy spar, carrying chlorides and bromides of silver and occurring in numerous fissures in a limited zone.

Both mines are being worked. The side line of the Silver King claim runs through the belt lengthwise, so that the Oregon No. 2 claim has within its surface boundaries one or more of the veins of the system.

The suit has been on trial about six or seven weeks. The lawyers are Messick and Perkins for Mr. Doe and W. F. Herron and A. H. Ricketts for the Silver King (defendants). The mining experts for the plaintiffs are Messrs. Louis Janin, Francis Reed and Wm. Edwards. Those for the defendants are Wm. Hayes Hammond, Wm. Irelan Jr. and Ross E. Browne. The case is a very important one, as it considers the lode question in a similar way to the famous Eureka-Richmond case, although the formation is different.

As in that case the principal inquiry is to ascertain the character of the zone, in order to determine whether it is to be treated as constituting one lode, or as embracing several lodes, as that term is used under the Acts of Congress of 1866 and 1872, under which the parties have acquired whatever rights they possess.

In Judge Field's decision in the Eureka case he held "that the Acts of Congress were not drawn by geologists or for geologists; they were not framed in the interest of science, and consequently with scientific accuracy in the use of terms. They were framed for the protection of miners on the claims in which they had located and developed, and should receive such a construction as will carry out this purpose. The use of the terms *vein* and *lode* in connection with each other in the Act of 1866, and their use in connection with the term *ledge* in the Act of 1872, would seem to indicate that it was the object of the legislator to avoid any limitation on the application of the Acts, which a scientific definition of any one of these terms might impose.

"It is difficult to give any definition of the term as understood and used in the Acts of Congress which will not be subject to criticism. A fissure in the earth's crust—an opening in its rocks and strata made by some force of nature, in which the mineral is deposited, would seem to be essential to the definition of a lode in the judgment of geologists. But to the practical miner, the fissure and its walls are only of importance as indicating the boundaries within which he may look for and reasonably expect to find the ore he seeks. A continuous body of mineralized rock lying within any other well-defined boundaries on the earth's surface and under it, would equally constitute, in his eyes, a lode. We are of opinion, therefore, that the term as used in the Acts of Congress is applicable to any zone or belt of mineralized rock lying within boundaries clearly separating it from the neighboring rock. It includes, to use the language cited by counsel, all deposits of mineral matter found through a mineralized zone or belt coming from the same source, impressed with the same forms and appearing to have been created by the same processes."

In the Eureka decision quoted, Judge Field, after referring to the opinions of experts, says that these gentlemen carried in their minds the scientific definition of the term lode as given by geologists—a fissure in the earth's crust filled with mineral matter—and disregarded the broader though less scientific definition of the miner, who applies the term to all zones or lodes of metal-bearing rock lying within clearly marked boundaries. It was his opinion that the Acts of Congress used the term in the sense in which the miners understand it.

In the case now in progress in Los Angeles, involving title to valuable property, one side is trying to prove to the court that the ore is on a

single mineral-bearing zone in which there are numbers of lodes or ledges all belonging to the same deposit, while the other side is endeavoring to demonstrate that each of the ledges or lodes is a separate and distinct one having no special relation to the zone as a whole. The decision will be watched with interest. Numbers of drawings, sections and plans of the mines have been made to demonstrate to the court the points involved. At the conclusion of the case we shall present to our readers such details as will be of general interest to the mining community.

Undeveloped Resources.

The natural resources of the State of California are great and exceptionally varied. The mineral domain is extensive and embraces a large number of substances of economic value. The agricultural and horticultural features are excelled by no other section of the Union. Yet there is room for development of these resources in all directions.

In whatever county one may go there are pointed out opportunities for investment, and those familiar with the locality can show where only capital is needed to develop some natural resource. In fact, many of us do not realize the value of things familiar to us, and our local capital does not seek, but needs to be sought.

We need a class of capitalists here who are investors rather than lenders of money. Men who start new enterprises and need capital are unable to find men to invest money in them, although with suitable security cash can be obtained. In other and larger centers of population, upon a proper showing, money can be obtained for direct investment in an enterprise, the capitalist depending upon legitimate profits rather than upon cent per cent interest.

As population increases in California and new men come among us, our undeveloped resources will be recognized and utilized as in other parts of the Union. Capital seems to center too much in the cities and remain in the cities. It seems difficult to attract it to any distance. Yet all the interior counties afford abundant opportunity for legitimate investment. It is to be regretted that our capitalists do not go further afield and assist to a greater extent in opening the material resources of the State.

African Gold Mines.

In another column will be found a memorandum of the terms and conditions upon which persons are permitted to prospect for minerals and metals in Mashonaland, Africa. This is a new country now being opened up. It lies some distance north of Kimberley, but is only about 300 miles from the east coast of Africa. The British South Africa Co. is a company chartered by the English Government. The quartz reefs found are to be operated by the prospector on joint account with the company, but the company claims no rights in respect to gold found in placer mines. It will be noticed that a certain amount of work must be done in the quartz claims, a 30-foot shaft being necessary within four months of registration. This rule is to insure development and prevent ground from lying idle.

From a private letter from Kimberley to the editor of the PRESS, it is learned that fairly good reports are coming in from the front. There are now some 600 or 700 men in Mashonaland. Quartz reefs are known to exist and will be thoroughly tested; and if placer diggings are struck there will be a "rush."

Mafeking, the starting-point for the new mining region of Mashonaland, is 100 miles north of the terminus of the railway, which is now at Vryburg. The latter town is about 150 miles north of Kimberley, which itself is 647 miles from Cape Town. The distances from Mafeking are given in the notice in another column. The name of the secretary of the company is also given, and miners on the Pacific Coast who have an eye on African gold fields may write to him for further information.

THE LEAD TRUST.—It is said on Wall street that the recent large transactions in the Lead Trust have been accompanied by a large increase in the number of transfers on the books, indicating that much of the stock purchased has been taken up and paid for by investors in anticipation of a favorable statement and dividend, which it is believed will be made in February.

The San Francisco Cancer Remedy.

It is a Cure and not a Mere Extirpation.

The world-wide excitement attending the recent discovery of the Berlin consumption cure seems to have awakened a new and most active interest in the claim which for three or four years has been made that a well-known practitioner in this city, Dr. C. A. Cook, has discovered a cure for cancer. It has long been fully believed by all who have made any effort to examine into the facts connected with this alleged cure that it is a reality, that it is a genuine cure and not a mere extirpation—a rooting or ontting out.

Physicians of all countries, and numerous uneducated "specialists," as they are pleased to call themselves, have from time immemorial cut out cancers or drawn them out by means of "plasters," sometimes, indeed, in very mild or doubtful cases of this malady such practitioners may have dissipated or "soattered" cancerous tumors by outward applications without the aid of either knife or plaster. Cases of a similar nature are on record in medical books, where what were supposed to be cancers have gradually disappeared from the system without any special treatment. Such "onres," however, have been attributed to the action of nature operating on unusually healthy systems, when the patient has followed a careful system of diet, etc. Nature often works wonders in disintegrating and driving from the system foreign bodies, or broken-down tissues and even fragments of bone—and thus, for ages, cancers have sometimes thought to have been "cured." But until our attention was called to the practice of this San Francisco specialist, the writer has never heard of anything which could be considered a "specific" for cancer. So much interest is just now being taken in regard to this matter, that we feel it is due to the public to give some information as to

The Character and Method of the New Treatment.

This new treatment has no need for the knife, and only in a few exceptional and mild cases is anything like a "plaster" used. Even when the latter is used it is not compounded with the severe caustics usually employed, but nevertheless does its work in a manner equally effective and with very little torture to the patient. But, in all cases, what are denominated "specifics" are employed, which act gently and without giving pain. In fact, the action of the specific assuages the pains which always accompany the growing tumor immediately upon their application. They moreover destroy the offensive odors which are nearly always attendant upon advanced cases. No minerals of any kind are employed in any part of the curative process. Every particle of the several motions and other compounds is either vegetable or animal.

This "onre" was not an accidental discovery, but consists of an elaborate treatment which has been evolved only after long years of careful study and experiment. Starting some 20 years ago from a mere germ, which was obtained for coin, the remedy has been worked until it has now assumed a well-perfected specific for this most dreaded of all maladies with which the human race is afflicted.

The Remedy is Simple as Well as Efficient.

Different from the idea of Dr. Koch, whose consumption remedy proceeds with violent and often dangerous action from the extremes or periphery of the body—the skin—through hypodermic injection under the skin, the constitutional portion of this cancer treatment is simply an alternative of pleasant and quite attractive taste introduced into the stomach—the fountain-head of nutrition, and thence, through physical movements, modifies and controls all the vital machinery of the system—absorption and nutrition—and in a way so vigorous and beneficent that morbid actions are forestalled and physiological ones so energetically and triumphantly substantiated, that, with the aid of the outward applications and the active endosmose action set up by use of the battery, every cancerous germ is not only disintegrated and dissipated, but is fully and effectually driven from the system. The evidence that this is so is found in the important fact that not one single instance of a return of any cancerous trouble has been reported or discovered, even after many years of waiting. Scores of patients now in this city, many of whom have been operated upon by our best surgeons, and who have been pronounced

again allotted and all of whom have been pronounced undoubtedly suffering (from the melody, have been treated, pronounced cured, and have never in any single case been subjected to a return. This may be regarded as evidence, beyond all question, of the reality of the cure! Evidence of this character has never yet failed to satisfy every person who has taken the trouble to look into it. Many physicians of standing are among those who have taken the trouble to investigate, and all have expressed themselves as perfectly satisfied that the facts are precisely as have been stated, but only two or three physicians have had the courage to publicly stand up to their convictions because of the fearful persecution which they have met and are sure to meet with from the ruling majority of the San Francisco faculty. Why this is so we leave for those medical gentlemen most interested in ignoring and suppressing an important truth to say. There are at this time 18 patients now under treatment for cancer, all of whom are doing well and will soon be discharged as cured.

This Assured Remedy is Entitled to Respectful Consideration and Investigation

By the medical faculty, because it is a reasonable and apparent truth of importance to medical science and to humanity everywhere. The practitioner has repeatedly offered to treat any patients in a reasonable stage of affliction, who may be submitted by any recognized body of local physicians. It is well known that the treatment is exceedingly mild and absolutely without danger. After years of waiting for our own health conservators to come forward and comply with so reasonable a request, the appeal has now been made to a city 3000 miles away.

Compared With Koch's Remedy.

That this remedy will be found preferable to that of Koch, which it is claimed has already been shown to be of some value in mild cases of cancer (lupus) as well as for consumption, is fully shown from the fact of its effective action in quite extreme cases, and with all classes of cancer—lupus, scirrhus, and especially with that peculiarly dangerous character of this malady which attacks female internal organs. In the latter case it is, if anything, more effective than in any other form of the malady. Such cases, when treated by this remedy, if taken in anything like the early stage, or about the time when a surgeon would suggest the use of the knife as the "only remedy," yield most readily and kindly, without any danger whatever of hemorrhage. Indeed, all natural hemorrhage in such cases is at once stopped, while the cancerous growth comes away gradually and without any suffering by the patient. In nearly all treatment, except in extreme cases, the patient is not confined even to the house—not even for a day. We know of what we are writing, from personal observation, in a great number of cases. The writer has never paid any attention to any case which has not been authoritatively pronounced cancer by some one or more of the most prominent physicians of the city.

The mode of treatment differs in toto from Koch's remedy and is all the more worthy of attention because it is analogous to the action of the usual remedies employed and in direct line with the practice which physicians all over the world have employed for thousands of years in the general treatment of diseases.

It should be stated that the preliminary act in treating either tumor or cancer by this method is by accelerating the passage of certain unguents through the skin by hand-rubbing and by electrical action. Electricity alone appears to be of but little account; but as an aid to the endosmosis action induced by simple rubbing, it is found of much service, and except in extreme cases, induces a more or less rapid dissolution of tumor or cancer, while the constitutional action of the remedies taken into the stomach causes an especially rapid excretion from the body of the diseased or broken-down tissue.

It is often the case that the physician is unable to say whether an apparent tumor is benign or malignant. With this remedy it makes no difference whether it is one or the other. The external applications and alternative remedies may be safely and effectively applied in either case.

Just How Remedies Cure

Will perhaps remain forever in the regions of



TOPOGRAPHIC FEATURES OF SOUTHERN COLORADO.

the unknowable. Mankind may differ or even quarrel as bitterly as they are able as to opinions, but experience is the grand "boss" at last, and subjugated by facts, opposition must retreat in assent and silence. No crime against progress is so great as prejudiced, angry and persistent war against calm and analytical investigation. The latter is that which has been sought by the writer and his friends during the four-year war which he has been compelled to wage against the prejudiced and persistent opposition of the medical faculty of this city, against the efforts at progress which a few humble but earnest citizens have been endeavoring to make.

Before closing this article, we wish to make a statement in refutation of charges which we understand have been urged to break the force of the articles which have heretofore appeared in these columns in reference to the matter of this cure. It has been charged that they were mere advertisements and paid for as such. We desire to say once for all that neither the writer nor any one connected with either of our publications has ever received, either directly or indirectly, one dollar or in any way the value of a dollar in payment for anything which has been written or printed, during the last four years or any other time, in regard to the matter under discussion. Whatever we have done or written has been purely in the interest of humanity and for the furtherance of medical science.

Mineral and Barren Belts.

In a paper by Theo. B. Comstock on the Geology and Vein Structure of Southwestern Colorado is an engraving, herewith reproduced, showing the orographic features of Southern Colorado and the boundaries of mineral zones and barren belts (approximately). The district considered is that portion of Colorado known as the "San Juan Country." In a previous number of the PRESS we gave a plate showing the orographic features of that State in a generalized manner.

In the Central San Juan area one of the most striking features in the distribution of the metalliferous tracts is their isolation from each other, and yet there is nothing in the geography or geognosy of our whole region which, from a cursory view, would explain this result. In only one instance is there a sudden change in topography at the edge of a mineral belt, but there are many similar topographic and geological breaks, which seem to have had little or no effect upon the vein courses. It is not meant that the topography is not closely related to vein distribution in minor features, for this is very evident; only the great geographical landmarks, like many of the higher peaks, do not form the barriers between fruitful and barren areas.

The exception noted is the present Continental Divide. Oddly enough, this almost completely separates the mining country from the Eastern unproductive territory. Approximately following the general trends of this watershed is the line of junction between the Central Highland and three sides of the "Bitter Country" (see plate). Up to this ridge line from the west the veins run abruptly, but, practically, they do not cross it. The hydrographic basin of the Rio Grande is of the most peculiar type in every way.

The engraving gives a clear idea of the geological structure of the region and of the adjacent country upon the east and west, with a plan of the radiating mineral zones of the Central San Juan area.

HENRY C. LEE died at his home in Oakland on Monday last, and was buried on Wednesday afternoon. He had been confined to his home since the latter part of November, and for some months previous had not been in good health. Mr. Lee has been employed with the MINING AND SCIENTIFIC PRESS Patent Agency for the past nine years, his special work being that of preliminary examinations, in which branch he was quite expert. Mr. Lee endeared himself to his associates by his genial manner and uniform good nature, always maintained even in the face of ill-health and adverse circumstances.

SUIT has been commenced at Grass Valley by S. P. Dorsey to compel Andre Chavanne to convey to plaintiff an undivided half interest in the Independence mining claim, adjoining the Maryland on the east.

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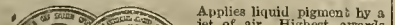
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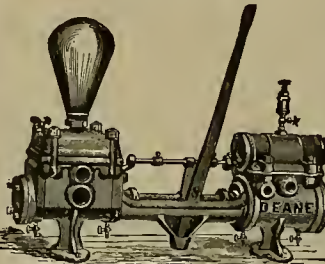
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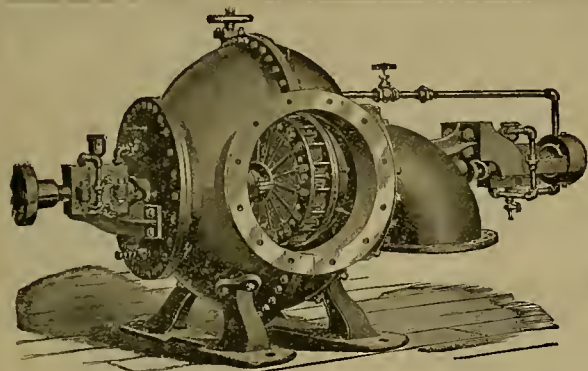
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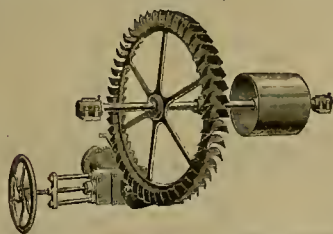
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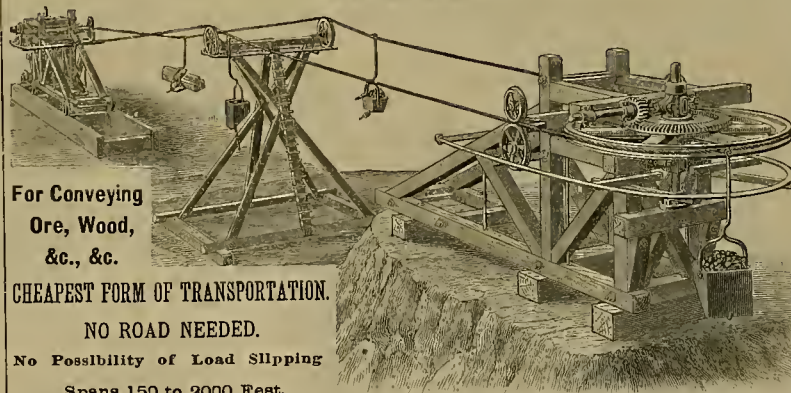
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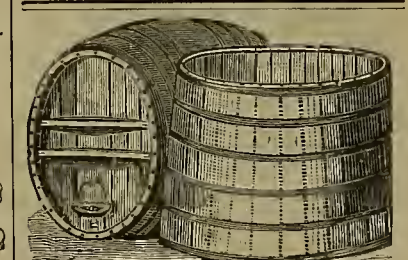
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, Dec. 31, 1890.

General trade is stagnant. Manufacturers, merchants and business men in general are engaged more in their annual settlements than in anything else. This will occupy their attention well up to the middle of January. From a thorough canvass of the different industrial interests in this city we can safely affirm that the outlook for 1891 is of the most flattering character. As a rule, interior merchants have smaller accounts than for years. There are few if any idle laborers, as the weather has admitted of outdoor work in all parts of the State. A larger fall or winter acreage has been seeded to grain than ever before, and it only requires light but well-distributed spring rains to produce heavy crops. The prospects for fruits, and as for that, all farm products are of the best. Among manufacturers the outlook is said to be promising. Coal promises to be cheap, while more work is expected. The mining industry, it is claimed by many, will show renewed life. Nearly all the old camps are renewing their youthful vigor and life. The money market is easier. Long-time loans are more readily negotiated and at a shading in interest. The disbursements from now on will be very heavy.

MEXICAN DOLLARS—The market has been quiet at 82@83 cts.

SILVER—Mint purchases under the new law began August 13. The range of prices and quantity thus purchased to date have been as follows:

	Range.	Ounces.
August.....	\$1 13.30 to \$1 20.25	3,309,000
September.....	1 19.50 to 1 13.00	3,137,600
October.....	1 18.95 to 1 04.90	3,330,000
November.....	1 07.70 to 07.10	4,062,000
December.....	1 02.50 to 1 09.00	3,890,000

Total public purchases.....18,268,000
Private purchases.....2,658,974

Total.....20,927,474
Amount required by law.....20,759,100

The market has been more or less inactive, causing quotations to be nominal. The Mint will resume purchases on Friday of this week. It is claimed that prices will rule higher. Interest now centers in Congressional legislation. Bimetallists are making a vigorous effort to pass a free-coinage bill, but at this writing no one dares predict that success will crown their efforts, for there is nothing so uncertain as the action of Congress on any important measure. If this Congress fails to pass a free-coinage bill, there can be no doubt but the next one will come to the rescue of the country and pass one.

QUICKSILVER—Receipts the past week aggregate 174 flasks. The demand is quiet. The market favors buyers.

LIME—Receipts the past week aggregate 3090 bbls. The call is slower, yet for the season it is exceptionally good.

ANTIMONY—Some shading is reported being made to large buyers.

LEAD—The market shows a fair degree of steadiness, as if bottom prices have been touched.

BORAX—Receipts the past week aggregate 220 cts. and exports by rail 320 cts. to Chicago. The market is steady, with a shade firmer tone. The East, it is claimed, will soon increase its purchases.

IRON—Imports the past week aggregate 100 tons from Oregon. The market is quiet, with prices barely steady. Eastern advices report many Southern furnaces out of blast, but owing to the stringency of the money market, other companies were unable to take advantage of the situation. Cash purchases can be placed low, but time purchases cannot be placed except at probably higher figures. English advices are favorable to better prices after the turn of the year. Many furnaces have gone out of blast.

COPPER—The market is unsettled. New York mail advices report as follows: Lake Superior mining companies have decided upon 15¢ per lb. as their price to the home trade for early 1891 deliveries. Quotations equivalent to 14¢ here have been made in the foreign markets to attract export business, and rumor has it that 14¢ would very probably be accepted. A line of about 1,000,000 lbs. Tamarack is said to have been sold for export at about 14¢. For other varieties of copper, prices are, as yet, rather uncertain, there being little business. About 13¢@14¢ for Arizona and 13¢ for common casting brands would appear to be near the mark.

COAL—Imports the past week aggregate as follows: Comox, 4300 tons; Nanaimo, 3432; Seattle, 2300; Departure Bay, 3423; Tacoma, 4000; Coos Bay, 1350; Liverpool, 2571; overland, 60; Kobe, 4400. Total, 25,782 tons. The market, although not quoted lower, is shaping itself for lower prices soon. Coast collieries are shipping more freely, while English coal will soon come to hand in more liberal quantities. In a fortnight, Australian coal will begin to arrive. In the meantime the weather, although cold, is not severe, and does not necessitate as large fires as usually obtain at this season. To offset this, more steam coal is being used, owing to clear weather admitting of more outdoor work.

Coal and Coke.

SPOT FROM YARD—PER TON.	TO LOAD—PER TON.
Wellington.....\$12 00	Australian.....\$7 75@
Grota.....14 00	Liverpool 8m.....8 50@
Carlton Hill.....10 00	Scottish Splint.....6 50@ 9 00
Nanaimo.....11 00	Cardiff.....5 50@
Gitman.....10 00	Lehigh Lump.....16 50@ 17 00
Seattle.....10 00	Cumberland bk 13 50@
Coos Bay.....7 00	Egg, hard.....15 00@
Cannel.....14 00	—
Egg, hard.....16 00	Coke—English.
Cumberland, in sacks 19 50	do, bulk.....18 00
do, bulk.....18 00	To load.....\$12 00@13 00
Walsend.....13 00@14 00	Spot, in bulk.....16 00@18 00

Sales at San Francisco Stock Exchange.

WEDNESDAY, December 31, 9:30 A. M.	
50 Alpha.....850	100 Grand Prize.....150
100 Andes.....900	50 Kentucky.....750
100 Belcher.....130	100 Mexican.....120
100 Best & Belcher.....130	100 Mono.....450
300 Bodie.....700	100 Ophir.....250
40 Bullion.....225	50 Overland.....150
50 Challenge Con.....250	200 Potosi.....450@475
50 Chollar.....200	100 Savage.....140
285 Con Cal & V.....240	100 Seg Belcher.....800
100 Crown Point.....105	100 Union Con.....150
300 Exchequer.....450	100 Yellow Jacket.....165
50 Gould & Outcrop.....125	

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COMPANY.	LOCATION.	NO. AMT. LEVIED.	DELINT.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Atlantic Con M Co.....	Nevada.....	25.	Nov 19.	Dec 23.	Jan 19.	D M Kent.....330 Pine St
Confidence Silver M Co.....	Nevada.....	75.	Nov 17.	Dec 22.	Jan 12.	A S Groth.....414 California St
Con New York M Co.....	Nevada.....	15.	Nov 12.	Dec 17.	Jan 6.	O E Elliott.....309 Montgomery St
Con Imperial M Co.....	Nevada.....	30.	Dec 13.	Jan 3.	Feb 7.	C L McCoy.....320 Sansome St
Contra Estaca Con Mex M Co.....	California.....	2.	Dec 9.	Jan 15.	Feb 7.	T Wetzel.....309 Montgomery St
Crown Point M Co.....	Nevada.....	53.	Dec 15.	Feb 14.	Apr 4.	George Gale.....309 Montgomery St
Exchequer M Co.....	Nevada.....	30.	Dec 9.	Jan 19.	Feb 5.	O E Elliott.....309 Montgomery St
Gray Eagle M Co.....	California.....	21.	Dec 11.	Jan 16.	Feb 9.	J W Pew.....310 Pine St
Head Centre & Tranquility M Co.....	Ariz.....	11.	Dec 16.	Jan 30.	Feb 20.	G W Luce.....132 California St
Imperial Marble Co.....	California.....	11.	Dec 16.	Jan 30.	Feb 20.	G W Luce.....132 California St
Leigh Gravel M Co.....	California.....	2.	Nov 22.	Jan 31.	Feb 24.	E E Fall.....320 Sansome St
Northeastern G & S M Co.....	Br Columbia.....	5.	Nov 12.	Dec 19.	Jan 17.	F Bonanza.....438 California St
Potosi M Co.....	Nevada.....	35.	Dec 18.	Jan 20.	Feb 10.	O E Elliott.....309 Montgomery St
Riverside M & M Co.....	California.....	1.	Dec 11.	Jan 12.	Feb 2.	J Stadfield.....309 Montgomery St
Tetrahoff M Co.....	California.....	5.	Dec 11.	Jan 8.	Feb 8.	W J Gurnett.....308 Pine St
Utah Con M Co.....	Nevada.....	11.	Dec 9.	Jan 19.	Feb 9.	A H Fish.....Nevada Block

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Bullion M Co.....	Nevada.....	R R Grayson.....	327 Pine St.....	Annual.....	Jan 3
Brunswick Con G M Co.....	Nevada.....	J Stadfield.....	309 Montgomery St.....	Annual.....	Jan 3
Con St Gothard & M Co.....	California.....	Theo Wetzel.....	320 Sansome St.....	Annual.....	Jan 5
Guasacaran & Cal M Co.....	Mexico.....	Edward Oliver.....	26 Mint St.....	Annual.....	Jan 5
Lone Star Q & G M Co.....	California.....	A W Blundell.....	2814 California St.....	Annual.....	Jan 17
Middle Creek M Co.....	California.....	H D Hawks.....	315 Pine St.....	Annual.....	Jan 13
Shasta Iron Co.....	California.....	C B Morgan.....	508 California St.....	Annual.....	Jan 13

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NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Candelaria Cons M Co.....	New Mexico.....	G Gale.....	309 Montgomery St.....	20	Nov 20
Eureka Cons M Co.....	Nevada.....	H P Bush.....	306 Pine St.....	25	Aug 5
Pacific Coast Borax Co.....	California.....	A H Clough.....	230 Montgomery St.....	1 00	Jan 10

San Francisco Metal Market.

WEDNESDAY, December 31, 1890.

WHOLESALE.		
ANTIMONY.....	23 @	—
BORAX—Refined, in carload lots.....	8 @	20
Powdered.....	8 @	—
Concentrated.....	7 1/2 @	—
All grades jobbing at an advance.		
COPPER.....	23 @	—
Block.....	23 @	—
Sheathing.....	23 @	—
Ingot, jobbing.....	18 @	—
do, wholesale.....	16 @	—
Fire Box Sheets.....	23 @	25
LEAD—Fig.....	55 @	—
Bar.....	64 @	61
Sheet.....	70 @	—
Pipe.....	61 @	—
Spot, discount 10¢ on 500 bags.....	18 @	—
Buck, 3/4 bag.....	2 10 @	—
Ohilled, do.....	2 20 @	—
QUICKSILVER—By the flask.....	52 00 @	53 00
Flasks, new.....	45 @	—
Flasks, old.....	41 @	55
CHROME IRON ORE.....	10 50 @	—
STEEL—English.....	16 @	20
Canton tool.....	9 @	9
Bills and diamond tool.....	8 @	10
Pick and Hammer.....	8 @	10
Machinery.....	4 @	5
Toe Calk.....	4 1/2 @	—
TINPLATE—B. V., steel grade, 14x20, to arrive.....	6 3/4 @	6 50
B. V., steel grade, 14x20, spot.....	6 50 @	—
Charcoal, 14x20.....	6 50 @	—
do roofing, 14x20.....	6 00 @	—
do, do, 20x28.....	13 00 @	22 1/2
Pig tin, spot, 3/4 lb, nominal.....	22 @	—
IRON—Bar, best.....	42 @	51
Norway, best.....	42 @	51
Spot.....	30 @	—
IRON—Glengarnock ton.....	34 00 @	—
Eglinton, ton.....	34 00 @	—
American Soft, No. 1.....	32 00 @	—
Oregon Pig, ton.....	33 00 @	—
Puget Sound.....	34 00 @	—
Bar Iron (base price) 3/4 lb.....	26 @	—
Clay Lane White.....	34 00 @	35 00
Shells, No. 1.....	34 00 @	35 00
Langdon.....	34 00 @	—
Thorncliffe.....	34 00 @	—
Garthierie.....	34 00 @	—
Barrow.....	34 00 @	—
Thomas.....	34 00 @	—
Cargollet.....	30 00 @	—

Eastern Metal Markets.

By Telegraph.

New York, December 31.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday.....	1 02 1/2	1 02 1/2	14 75	4 15	19 70
Friday.....	1 02 1/2	1 02 1/2	14 75	4 15	19 70
Saturday.....	1 02 1/2	1 02 1/2	14 75	4 15	19 70
Sunday.....	1 02 1/2	1 02 1/2	14 75	4 15	19 70
Monday.....	1 02 1/2	1 02 1/2	14 75	4 15	19 70
Tuesday.....	1 02 1/2	1 02 1/2	14 75	4 15	19 70
Wednesday.....	1 02 1/2	1 02 1/2	14 75	4 15	19 70

Trade is stagnant. It now looks as if there will be no material change in the situation until well into January. The money market promises to be very easy after the turn of the year.

Mining Share Market.

Comstock mining shares the past week were strong and higher on Friday, but began to set back on Saturday. On Monday afternoon and yesterday (Tuesday) morning the lowest prices were touched. The manipulation appears to be in Potosi and Bullion so as to get in other stocks preparatory to an up move. The lowest prices since 1836 were touched the past week by the following stocks: Con. Virginia, Ophir, Union, Mexican, Sierra Nevada, Crown Point, Challenge Yellow Jacket, Hale & Norcross, and Alta, and yet there are many who are expecting these stocks to sell for less money. There can be no doubt that everything is being done to depress the market, and at the same time not lose stock. This always obtains before a decided up move in prices. Judging the future by the past, the market should do very much better soon, although many do not look for much before the spring months. This opinion is doubtless formed from the fact that up moves for several years past have been in the spring and in the fall. It may be that the deal this year will be over before spring.

Is it not about time that a grand jury investigates the charges so persistently made against Comstock mine managers, for not complying with the laws of the State of California? Such an investigation would prove of the greatest possible benefit to the mining industry in this coast.

The milling charges, including transportation, on the Comstock are \$7 a ton, with a rebate of \$2 a ton, which makes the charges virtually \$5 a ton.

So far there has not been any freezing weather on the Comstock to give an excuse for shutting down mills. News from the Comstock mines reports they are skirting the ledge on the Potosi south drift running toward Bullion, and, as usual, the character of the ore changes daily. Some ore has been cut going over \$100 a ton, while at other places it goes down to almost nothing. They have run lengthwise of the ledge for a distance of over 30 feet. While many are watching with interest the work going on in Potosi, the better informed miners think the

"true business" is in some other mine. Time alone can prove if this is correct. In Savage, they are still sinking in ore going from \$30 up to over \$50 a ton. It looks as if they are uncovering a valuable body of ore, which, unless spirited away, will give good returns to stockholders. In Hale and Norcross, they are preparing to prospect more actively to the west the 1300 and 1400 foot levels. Miners think favorably of the outlook. The superintendent of Con. Virginia still ignores the 1400-foot level. By those who should know, it is claimed that there is rich ore on this level. Why not run for it? No further news is given from the northwest drift in Best and Belcher, which was being run to tap the continuation of the rich ore found in Con. Virginia.

In Alpha and Exchequer, active and important work is being done, as there is also in Con. Imperial, Challenge and Confidence. In the latter two, with the opening up of the 300-foot level, a body of rich ore will be uncovered, that, if mined honestly, will admit of dividends being paid. Important secret work is being done in Yellow Jacket and Crown Point.

From outside mining districts the news is becoming more interesting. In the Bodie district, the Standard mine reports a strike of high-grade ore running over \$100 a ton. In Bodie, all advices are of the most encouraging character. Important work is being done in Bulwer and Mono. In the Quijota district, it now looks as if more will be done soon to put the mines on a paying basis. From the Tuscarora districts our advices are confirmatory of more rich ore being discovered in some of the mines. The work being done in Belle Isle on the 450-foot level is closely watched.

Probably one of the most important events that has lately taken place in the mining share market, was the serving to-day of a notice by M. W. Fox, through his attorney, W. T. Baggett, on Mr. Levy, president of the Savage Mining Co., requesting, as owner of 19 1/2 feet of the old Bowers and Rogers title to the Savage ground, that an accounting or adjustment be made of all billion taken out of the mine. The Bowers and Rogers title was confirmed by the courts in a suit brought by the Savage Mining Co. against the Bowers and Rogers claimants. After the decision in favor of the claimants against the company, the Savage Mining Company bought all the claimants' interests excepting the above 19 1/2 feet. It is only reasonable to suppose that Mr. Fox will also take steps to prevent the company confiscating to the mill much of the rich tailings, and will also insist upon the mine's being managed differently. These changes will result in great benefit to the mining industry.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING DEC. 11.	WEEK ENDING DEC. 13.	WEEK ENDING DEC. 24.	WEEK ENDING DEC. 31.
Alpha.....	80 1.05	75 1.05	75 .90	75 .95
Alta.....	80 .90	75 .75	75 .60	75 .65
Andes.....	80 .85	75 .55	80 .53	70 .60
Belcher.....	1.70 1.90	1.25 1.70	1.25 1.45	1.20 1.50
Best & Belcher.....	2.20 2.45	1.85 2.40	1.90 2.10	2.10 2.35
Bodie.....	1.75 2.10	1.45 1.90	1.55 2.10	2.05 2.40
Bodine Con.....	85 .90	60 .90	55 .60	50 .70
Bulwer.....	20 .20	15 .20	15 .20	15 .20
Commonwealth.....	1.25 2.00	1.00 1.25	75 .90	90 .95
Con. Va & Cal.....	3.05 3.25	2.55 3.10	2.60 3.10	2.70 3.15
Challenge.....	80 1.15	1.45 1.8	1.50 1.60	1.50 1.60
Chollar.....	2.35 3.05	1.95 2.80	2.05 2.40	2.20 2.35
Confidence.....	4.00 4.70	3.80 4.00	4.00 4.90	5.25 4.75
Con. Imperial.....	20 .15	20 .15	20 .15	20 .15
Crown Point.....	40 .25	35 .30	35 .30	40 .40
Crocker.....	1.50 1.70	1.10 1.50	1.20 1.00	1.15
Del Monte.....	20 .10	15 .15	15 .15	15 .15
Eureka Con.....	60 .40	45 .40	45 .40	45 .40
Exchequer.....	20 .25	15 .20	15 .20	15 .20
Gould & Curry.....	1.50 1.85	1.15 1.50	1.30 1.20	1.35
Hale & Norcross.....	1.40 1.75	1.15 1.50	1.45 1.10	1.35
Julia.....	15 .20	15 .20	15 .15	15 .15
Justus.....	1.05 1.25	75 .10	85 .10	75 .10
Kentuck.....	1.05 1.25	75 .10	85 .10	75 .10
Lady Wash.....	25 .15	20 .20	20 .20	20 .20
Mono.....	25 .40	20 .40	20 .40	20 .40
Mexican.....	2.5 2.75	2.10 2.50	2.35 2.50	2.35
Nevada.....	20 .15	15 .15	15 .15	15 .15
North Belle Isle.....	70 .90	70 .70	70 .75	75 .75
Nev. Queen.....	50 .80	40 .80	40 .80	40 .80
Occidental.....	85 .95	70 .75	75 .85	65 .70
Ophir.....	80 3.60	85 3.50	85 2.90	50 2.90
Overman.....	1.85 2.05	1.60 2.00	1.70 1.85	1.85
Potosi.....	3.80 6.50	3.70 5.12	3.95 4.80	5.50 5.80
Peerless.....	25 .15	20 .20	20 .20	20 .20
Peavee.....	1.50 1.95	1.50 1.65	1.75 1.45	1.60
S. B. & M.....	1.05 1.10	75 .10	80 .90	75 .90
Sierra Nevada.....	1.80 2.10	1.40 1.90	1.45 1.55	1.45
Silver Hill.....	20 .25	15 .20	20 .25	20 .25
Union Con.....	1.90 2.15	1.50 2.00	1.55 1.65	1.40 1.60
Utah.....	60 .70	35 .35	45 .40	45 .40
Yellow Jacket.....	2.05 2.20	1.55 2.10	1.80 1.60	1.80

THE Mayor of Oakland has signed the ordinance appropriating \$20,000 for the initiation of the great work of dredging and boulevarding Lake Merritt.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING DEC. 23, 1890.

443,172.—BALING PRESS—Geo. B. Allen, San Leandro, Cal.
443,130.—BILL FILE—Fay Butler, Oakland, Cal.
443,315.—WINDOW SHADE AND SCREEN FIXTURE—Thomas Chope, S. F.
443,204.—DEVICE FOR INDUCING FULL RESPIRATION—C. C. Davis, Los Angeles, Cal.
443,394.—LAWN-SPRINKLER—R. Franken, Pomona,

Silver-Plated Amalgam Plates.

The greatly increasing demand for these plates by gold miners has demonstrated their superiority over all other methods for saving gold in quartz or placer mining, particularly fine or float gold. These plates are in great demand in all the Pacific Coast mining region, from Alaska to South America, the Rocky Mountain mining States and Australasia.

The San Francisco Plating Works, 653 and 655 Mission St., San Francisco, of which Mr. E. G. Denniston is proprietor, are constantly filling orders for them, sending out a great many thousands of square feet every year to gold miners all over the world. The plates for all the large 120 stamp mills in Alaska were made at the San Francisco Plating Works.


Mr. Denniston is the pioneer in this line of business, having established his works 23 years ago. Mr. Denniston says he has received every first premium awarded for silver-plated plates at the fairs held on the Pacific Coast, having received 15 silver medals in all.

The reputation of his plates is world-wide, he having been successful in competition with all others. Only the best Lake Superior copper and refined silver are used in their manufacture. They are made of any size, plain or corrugated.

The great success of Mr. Denniston's plates is due to his thorough knowledge of the business and possession of the best facilities; also, to adhering strictly to agreement in depositing full weight of silver on every order.

The work done at the San Francisco Plating Works consists of gold, silver, platinum, nickel, brass, copper and bronzes plating on every description of metal work. The work is first-class, and done at lowest possible prices.

Dewey & Co.'s Scientific Press
Patent Agency.



OUR U. S. AND FOREIGN PATENT AGENCY presents many and important advantages as a Home Agency over all others, by reason of long establishment, great experience, thorough system, intimate acquaintance with the subjects of inventions in our own community, and our most extensive law and reference library, containing official American and foreign reports, files of scientific and mechanical publications, etc. All worthy inventions patented through our Agency will have the benefit of an illustration or a description in the MINING AND SCIENTIFIC PRESS. We transact every branch of Patent business, and obtain Patents in all countries which grant protection to inventors. The large majority of U. S. and Foreign Patents issued to inventors on the Pacific Coast have been obtained through our Agency. We can give the best and most reliable advice as to the patentability of new inventions. Our prices are as low as any first-class agencies in the Eastern States, while our advantages for Pacific Coast inventors are far superior. Advice and Circulars free.

DEWEY & CO., Patent Agents,
220 Market St., Elevator, 12 Front St., S. F.
TELEPHONE No. 658.

A. T. DEWEY. W. B. EWER. OEO. H. STRONG.

TRAFTON'S
Gold Saving Device.

Patented June 17, 1890.



A NEW DEVICE TO BE USED ON TABLES FOR Gravel Mills and Undercurrents to Hydraulic Claims. When used in quartz mills it is equal to silvered plates. It is simple and economical in its construction and practical in its operation. Send for circulars.

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Yankee Jim's, Cal.

THE BRITISH
SOUTH AFRICA COMPANY.

MEMORANDUM

Of the Terms and Conditions upon which
Persons are Permitted to Prospect for
Minerals and Metals in Mashonaland.

Prospecting Licenses.

1. Any person may take out a license on binding himself in writing to obey the Laws of the Company and to assist in the defence and maintenance of Law and Order if called upon to do so by the Company—such license to bear a stamp of the value of one shilling.

Right of Prospecting Holders to Peg Off Claims.

2. Every license-holder is free to peg off one alluvial claim and ten quartz reef claims in block. When the claims have been marked off the same shall be registered and the license-holder shall receive a certificate of registration—such certificate to bear a stamp of the value of half a crown.

Size of Claims.

3. Alluvial claims are in extent 150 feet by 150 feet. Quartz reef claims are in extent 150 feet in the direction of the reef and 100 feet broad. The claimholder may follow the reef in all its dips, spurs, angles and variations.

Terms on which Quartz Reef Claims may be Held.

4. Every registered quartz reef claim is to be held by the prospector on joint account in equal shares with the Company, and every transfer, hypothecation or lien of his interest in such claims is subject to the rights of the Company.

Registration of Alluvial Claims.

5. Certificates of registration of an alluvial claim or portion of claim in any alluvial digging are to be covered by a stamp of £1 for each month for which such claim or portion of claim is registered, payable in advance; the Company, however, claim no rights in respect to gold won from alluvial claims.

Discoveries of Alluvial Diggings.

6. The Discoverer of an alluvial digging, distant not less than ten miles from any known alluvial digging, shall have the right to peg out two alluvial claims in addition to his other rights.

Work to be Done on Claims

7. Every digger shall, within four months from the registration of the block of claims, under penalty of forfeiture of his claim license, sink upon his block of quartz reef claims either a shaft of a depth of 30 feet in the reef or a shaft of at least 30 feet outside the reef with a cross-cut through the reef.

Certificate of Inspection.

8. So soon as the claimholder has done the required amount of work and has given evidence that he has opened up a payable reef, he shall receive an Inspection Certificate to the effect that the required work has been done—such Certificate to bear a stamp of the value of 15 shillings.

Payment of Claim License.

9. Prior to flotation the claimholder shall pay no license. After flotation the license shall be at the rate of 10s (ten shillings) per claim per month.

Flotation

10. On claims being ascertained to be payable, the Company have the right to float them into either a joint stock company or into a syndicate. The Company shall therefore within a reasonable time either make a proposal or decline to do so. If the proposal is accepted by the claimholder he shall on flotation be entitled to half the vendor's scrip in the shares of the Company so floated. If the claimholder is not satisfied with the Company's proposals, he has the right within one year to prove to the Company that he is in a position to float on better terms, and he shall, on the flotation of the claims, give the Company half the vendor's scrip.

Pegging Out of Additional Claims.

12. Any claimholder shall be at liberty to peg out a fresh block of ten (10) claims.

(i.) When he shall have given notice of abandonment of his existing block of ten claims.

(ii.) When he has received his Inspection Certificate from the Mining Commissioner.

But no claimholder who has acquired his claim or claims as a prospector shall be the registered claimholder of more than two blocks of claims of ten claims each.

Agreement.

13. An agreement, binding prospectors to abide by the Laws of the Company under penalty of forfeiture of rights, is to be signed by all the prospectors either at Kimberley or Tuli.

By order.

F. RUTHERFORD HARRIS,
Secretary.

ITINERARY OF ROUTE.

MAFEKING—100 miles north of terminus of railway, which is now at Vryburg. The latter town is about 150 miles north of Kimberley. Kimberley is 647 miles from Capetown.

DISTANCE FROM MAFKING ABOUT

PALLA CAMP—Telegraph Station	80 miles
of Notwana and Crocodile Rivers	200 "
ELEBE—On the Lotsani River	230 "
MACLOUTSIE CAMP AND POST—Telegraph Station, Macloutsie River	320 "
TULLI CAMP AND POST—Telegraph Station, Tullis and Shashi Rivers	370 "
VICTORIA CAMP AND POST—35 miles north of the Lunde River	600 "
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Assessment Notices.

GRAY EAGLE MINING COMPANY.

Location of principal place of business, San Francisco, California. Location of works, Placer County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 24th day of December, 1890, an assessment, No. 21, of Three (3) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 26th day of January, 1891, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on MONDAY, the 16th day of February, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

A. W. BARRON, Secretary pro tem.
Office, Room 11, No. 303 California Street, San Francisco, California.

INYO MARBLE COMPANY.—LOCATION

of principal place of business, San Francisco, California. Location of works, Keeler, Inyo County, California. Notice is hereby given, that at a meeting of the Board of Directors held on the 10th day of December, 1890, an assessment (No. 11), of Ten Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, 132 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 30th day of January, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 20th day of February, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.

G. W. LUCE, Secretary.
Office, 132 California Street, San Francisco, California.

The German Savings and Loan Society.

526 California Street.

DIVIDEND NOTICE.

For the half-year ending December 31, 1890, a dividend has been declared at the rate of five and forty-hundredths (5 4/100) per cent per annum on Term Deposits, and four and one-half (4 1/2) per cent per annum on Ordinary Deposits. Payable on and after FRIDAY, January 2, 1891.

OEO. TOURNAY, Secretary.

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Branch, 1700 Market Street, Corner Polk.

For the half year ending with 31st December, 1890, a dividend has been declared at the rate of five and four-tenths (5 4/10) per cent per annum on Term Deposits and four and one-half (4 1/2) per cent per annum on Ordinary Deposits, free of taxes, payable on and after Friday, 2d January, 1891.

LOVELL WHITE, Cashier.

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Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and perchloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Pathe's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heating of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroeck's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Knecker's battery, Noice's pulverizer, a cheap rock breaker, etc.

In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quick-silver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

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MINING AND
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1891. C

HANDY
CALENDAR.

1891	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Jan.	1	2	3	4	5	6	7
Feb.	8	9	10	11	12	13	14
March	15	16	17	18	19	20	21
April	22	23	24	25	26	27	28
May	29	30	31	1	2	3	4
June	5	6	7	8	9	10	11
July	12	13	14	15	16	17	18
Aug.	19	20	21	22	23	24	25
Sept.	26	27	28	29	30	31	1
Oct.	2	3	4	5	6	7	8
Nov.	9	10	11	12	13	14	15
Dec.	16	17	18	19	20	21	22

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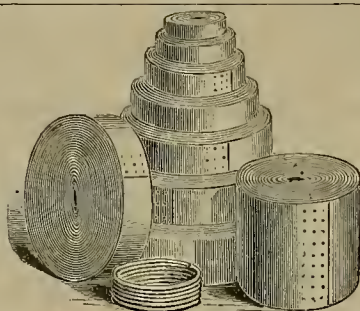
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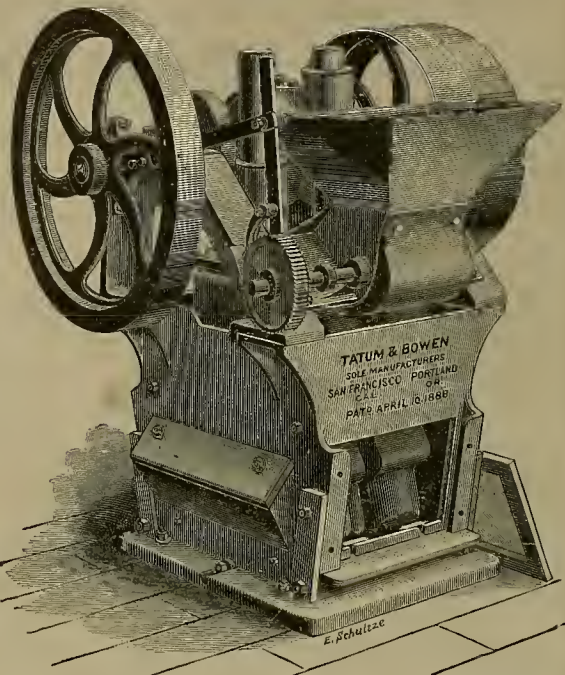
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That it will crush and discharge through a No. 30 mesh wire screen, 6 tons of average quartz per 24 hours; that, compared with the common stamps, the power required to do the same amount of work is considerably less—the slipping motion of the stamps reducing the ore much faster than the drop alone can; that the discharge is good, and as to amalgamating and saving gold, my experience with it is that it is just about the same as the ordinary battery.

To the above I shall add that the new Automatic Feed attached is a perfect success. It can, in a moment and without stopping, be adjusted to feed just as "high" or "low" as desired, and can be depended upon to supply the stamps with ore exactly as they need it. This is important, as it saves feeding by hand, which cannot be considered at the present day, or the purchase of a high-priced feeder.

Considered as a convenient Mill for prospecting, or for a small mine, it fills the bill.

Yours truly, [Signed] **JAS. S. REYNOLDS,**
 Supt. New York Mine, Railroad Flat.

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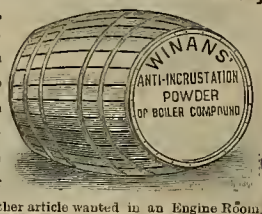
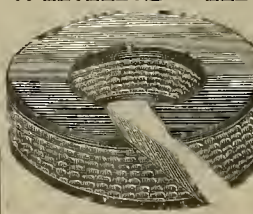
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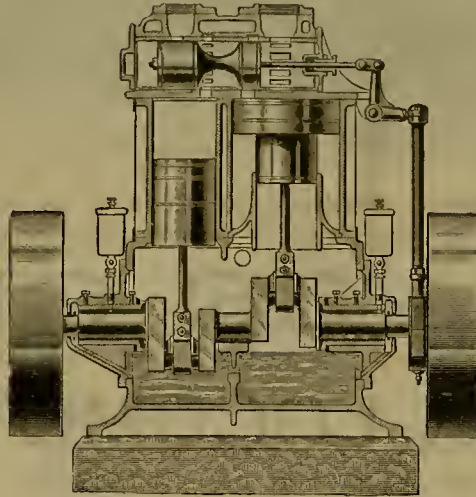
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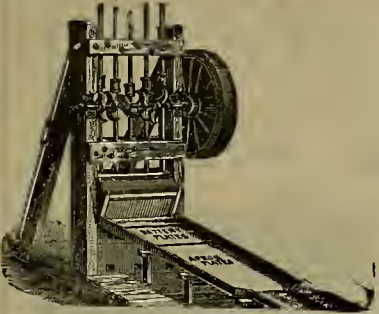
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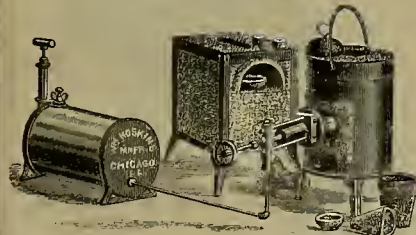
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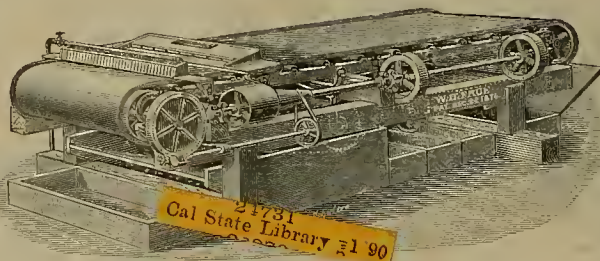
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There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), LONDON, October 3, 1885.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 41 additional Frues and more stamps have been purchased. ADAMS & CARTER.

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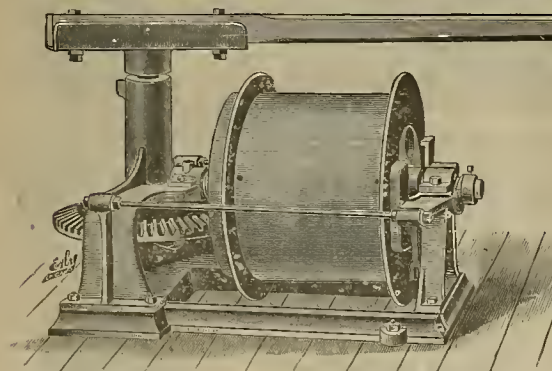
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These Hoisting Whims are built entirely of Iron and Steel, mounted on a heavy base plate, and, consequently, are very durable and cannot be affected by extremes of either cold or heat or climatic influences.

The hoisting drum is completely under the control of the person in charge of the hoisting or lowering through the shaft of the mine.

As the drum is entirely independent from the driving gears, the operations of hoisting, dumping bucket and lowering can be performed with the horse in constant motion, a feature not possessed by any other horse hoist in the market, and one that greatly increases their capacity by avoiding the loss of time due to stopping and starting the horse.

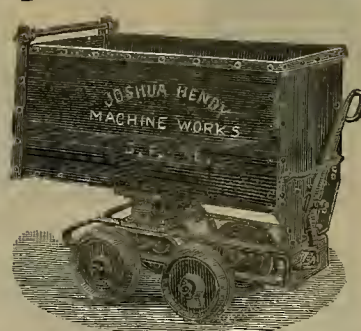
They are very light and compact, and can be packed for transportation by mules. Their cost of erection is very slight; two men, in half a day, being able to put one in place, ready for work.

With each Whim, working drawings are furnished, showing in detail the proper construction of Gallows Frame and foundation for Hoisting Whim.

We carry in stock the following sizes:

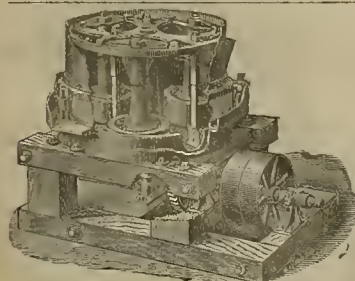
- No. 1.—Capacity with One Horse and Single Line, 800 pounds, 75 Feet per Minute.
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Weight of machine, 1200 pounds. Total shipping weight, including Sweep, Levers and Sheaves, 1400 pounds.



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VOL. LXI.—Number 2.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, JANUARY 10, 1891.

Three Dollars per Annum.
Single Copies, 10 Cts.

San Bernardino County Silver Mills.

The Runover mill, a representation of which is given in the accompanying cut, is situated on the edge of the desert south of Calico mountain, in Calico district, San Bernardino county, this State. It is the property of J. S. Doe of San Francisco, who is known as the "mining king" of Calico district, he being the possessor of 32 mining claims, most of them being covered by U. S. Patent, and many of them valuable properties.

The mill in which the ore from all Mr. Doe's mines is crushed is a 20-stamp one, equipped with all modern appliances. The Boss amalgamating process is used. The cost of reduction of the ore is only \$3.50 per ton, although coal from Gallup, costing \$9 per ton, is used for generating steam.

When the Silver Valley Land & Water Co. has completed its ditch, water for power can be procured at nominal expense, which will materially reduce the expense of ore-crushing at this point. The mill has been principally supplied with ore from the Red Cloud, Mammoth, Silver Monument, Garfield and Occidental mines. Its capacity is 60 tons per day.

The Waterloo Mills, shown in the engraving, are the property of the Oro Grande M. Co. of Milwaukee, and are situated one mile and a half north of Daggett, San Bernardino county. C. M. Sanger is the manager of the company and Emil Sanger the superintendent. The 60-stamp mill is new and has all modern appliances for handling silver ore cheaply. The 15-stamp mill was the first one erected by the company for reducing the rich ores of these numerous mines. Their principal mine is the Silver King, and an important lawsuit is now pending in Los Angeles for a portion of this claim, J. S. Doe, the owner of the Runover mill, being the other contestant in the suit, which was referred to in the PRESS last week.

The Oro Grande Co. is working in these two mills the ores from the Waterloo mine, which are transported to the mill on a narrow-gauge road six miles in length.

By using the Boss continuous process they mill these ores for \$4 per ton. Gallup coal costs \$8.75 per ton by contract. The stamps of the large mill weigh 850 pounds each, and crush 3 tons to the stamp in 24 hours. There are 9 grinding pans, 2 amalgamating pans, 1 cleanpan and 12 settlers. The building is lighted by electricity, and steam is used as the motive-power.

Report of the Debris Commission.

This document has, as we are informed, been so far advanced toward completion that it

nor do we apprehend there will be strong dissent to it in any other quarter. So capable are the members of this Commission known to be, and so disinterested have they shown them-

The New Geological Map.

The preliminary geological, mineralogical and topographical map of the State of California, prepared by Wm. Irelan, Jr., State Mineralogist, has just been issued by the Mining Bureau. It is artistically a fine work and of royal proportions, having been projected on a scale of 12 miles to the inch. While this map, as its name implies, is but the basis of something more extended to be worked out hereafter, it is nevertheless wonderfully full, considering the short time allowed for gathering and collating the data of which it is composed.

We find here, as a ground work, the topography of the entire State, delineated in a general way; the principal mountains with their culminating peaks, together with many of the subordinate ranges, isolated buttes and volcanic cones; the rivers and larger creeks, the bays and inlets; lakes, lagoons, sinks, salines and other deep-lying desert depressions are all accurately laid down here. The entire coast-line of the State is faithfully depicted, the only islands being also shown. The towns, cities and mining camps; the tule, salt and marsh lands; the railroads, built and projected; the base lines and lines of latitude and longitude with such portions of the public domain as remain unexplored, also such as have been surveyed, sectioned and subdivided, are each in its proper place exhibited. In short, every notable object, locality and physical characteristic of California seems to have found a place on this great land chart.

The several rock formations that go to make up the crust of the earth, also the auriferous gravels and quartz lodes are designated by different colors, whereby their sites and comparative extent can be readily seen and distinguished. In the margin is placed a table showing the altitudes of mountain peaks and passes as well as of many

other points of special interest. In another table all the more valuable metals and minerals are represented by figures, which, besides indicating the localities of their occurrence, denote their relative importance, gold being numbered 1, silver 2, etc. A list is given of all the Mexican and Spanish grants issued in California.

There are other features of this map calculated to greatly enhance its utility, but to which we cannot at this time give more extended notice. When the manner of disposing of this map shall have been fully determined upon, we will advise the public of the fact.



THE RUNOVER MILL, CALICO MINING DISTRICT.



THE WATERLOO MILLS OF THE ORO GRANDE MINING CO.

awaits now only some revision at the hands of the Commission when it will be forwarded to the War Department at Washington, an event that it is expected will occur about the end of the present month. As to the purport of this report, we are of course not advised, nor will this be generally known until the report itself shall be due course of events be given to the public.

Whatever the finding of the Commission, should any definite conclusions be reached by it, we think we can answer for it that the same will prove satisfactory to the hydraulic miners,

that all the parties concerned in this issue repose in them the utmost confidence. Whether or not there may follow entire compliance with their recommendations, should they have any to make, certain it is no one will presume to question their ability or impeach their integrity. That their report, whatever it may be, will prove helpful in the solution of this vexed question we verily believe. We await its appearance.

The Copper Queen Co., Arizona, have just put up over \$70,000 for the Neptune group.

San Bernardino County.

Its Mineral and Other Resources.

NUMBER XXV.

[Written for the Press by JAMES H. CROSEMAN.]

Exchequer Mining District.

From Fenner station to Goff, on the line of the A. & P. R. R. (distant 12 miles), we enter the southwesterly border of the above-named district, which is north of the railroad and in the northerly extension of the Pah-Ute range of mountains. It embraces an area of 402 square miles. The formation is lime, porphyry trap and secondary granite. This district, though extensive and rich in mineral wealth, has been but little prospected, owing to a scarcity of water—there being but three springs of note in this extensive area. Two of these are near the Cashier camp, and the other, known as the Piute Spring, is situated in the extreme northeasterly portion of the district.

The principal mines of the district occur in the vicinity of Cashier camp, seven miles by road northeasterly from Goff station.

The Exchequer mine has been developed by two shafts, one of 40 and the other of 30 feet. The gangue of the vein is quartz varying from one to six feet in width. The ores are chlorides of silver; values from 50 to 150 ounces per ton. The vein in depth is a well-defined quartz, white, but barren of ore.

The Dreadnaught has an 8 foot ledge and a 50-foot shaft. The grade of the ore exposed varies from one to 600 ounces of silver per ton. This mine, like the Exchequer, is barren in depth so far as tested. The remaining three locations are undeveloped.

The northerly series of the parallel veins consist of the Center No. 1, the most easterly; thence westerly on the same vein, the Bermuda, Anchor and Center West extension, none of which have any developments of note.

Of the southerly vein of the series, the Cashier is the best developed. There are three shafts of 10, 75 and 150 feet respectively. Lateral drifts are being driven on the vein between the shafts on the 70-foot level for working and ventilation purposes, and preparations are being made for sinking No. 1 or East shaft to the 200-foot level. From these workings, two carloads of ore have been extracted and shipped to San Francisco, which yielded \$100 per ton. One-quarter of the value was gold and the remainder silver. The ores of these mines to all appearances go to the deep and the prospects are encouraging for a good mine.

The remaining locations are known as the Cashier Extension East, Occidental, Perseverance and Phoenix. The Cashier proper is the central claim, and W. K. Alderley, Consulting Engineer of the Waterloo mines of Calico, is the leading spirit of the enterprise.

The Ventrigger Mines

Are situated nine miles north of Goff Station and comprise a blanket or surface deposit of the ore of copper, carrying both gold and silver. The droppings show a width of 60 by 200 feet in length. Developments consist of numerous pits and three small shafts. The ore obtained runs from 5 to 40 per cent in copper carbonates and oxides—the latter predominating. The silver values vary from 2 to 10 ounces; the gold averages \$6 per ton. A shipment of selected ores has been made to San Francisco, yielding a small profit over expense. Water is hauled from Homer station, a distance of 10 miles, to empty the camp.

The Sacramento Mining District

Cornere on the north west at Homer station on the A. & P. R. R. Its dimensions are 144 square miles. The easterly boundary line is 12 miles from the Colorado river at a point opposite the Needles. This district promises to be an important gold-producer. The veins are of mammoth proportions and well-defined gangue quartz, carrying free-milling gold ore. The principal mine is known as the Ithex.

We retrace our steps and return via Homer, Goff and Fenner to Danby and prepare for a visit to the celebrated old woman of Old Woman's mountain in which is situated the

Scanlon Mining District.

To avoid repetition, the reader is referred to the MINING AND SCIENTIFIC PRESS of Aug. 9th, which contains Article No. 5 of this series, in which is a description of the Old Woman's mountain and its mineral features. On the summit of the range there are two figures standing in bold relief against the horizon that bear a strong resemblance to the female form dressed in modern costume.

The axis of the range is granite, through which courses diagonally a belt in which a powerful vein of quartz and baryta occurs, carrying the ores of lead and silver in the form of carbonates, galena, brittle silver, and chlorides of silver. Values vary from 20 to 60 per cent of lead and from 10 to 65 ounces of silver per ton. The vein is strong, well defined and traceable for a distance of more than 6000 feet. The Buckeye has been considerably developed by shaft and drift; the Keystone is adjoining; and others are the Hawkeye, Silver Wave, and Thompson. These claims are situated on what is known as Carbonate Hill. Their courses are northerly and easterly and their strength from 30 to 50 feet. From this vein in an easterly direction on Mineral Hill in the granite proper, an extensive group of small silver-bearing

value occurs, carrying high-grade ores. Their locations are as follows: Big Chief, Old Lady, Silver Cliff, Morning Star, Golden Eagle, Silver Top, Stella, May Queen, Silver Leaf, Hunter, Little Giant, West End, and Mayflower. The Hunter has a 200 foot tunnel showing high-grade ore. The Little Giant has a 10 foot out, the Mayflower a 50-foot shaft. The developments, though insignificant, give promise of great future values. Robert Hunter is the moving spirit of the mines of the Scanlon district.

Returning to Danby, we take a southeasterly direction, leaving the Old Woman and her mountain on our left hand in a northerly direction, and at a distance of 25 miles at the southerly extremity of the mountain we reach the head of what was at one time a saline lake of considerable extent, judging from its basin-shaped formation and an intensely saline deposit found in its center of about three miles in circumference. This deposit is known as

Crystal Salt.

A very appropriate name, as aside from its beautiful, clear, transparent, crystalline structure, it is very near chemically pure chloride of sodium. Near the center of the head a shaft has been sunk 60 feet. This crystallized product returned, by analysis at the California State Mining Bureau's laboratory, 97 per cent pure salt. Water was encountered at a depth of 33 feet, which, on evaporation by the sun's rays, returns a pure saline powder suitable for table use or for any other purpose for which salt is used. This salt has been mined, hauled to Danby on the A. & P. R. R., and shipped to Arizona and Mexico for curing beef, salting stock, and for ordinary purposes. W. H. Drew of San Bernardino is the owner.

(To be Continued.)

A New Mining District.

A new mining district has just been formed, to be known as the Soda Creek mining district. It is situated on the headwaters of Little Kern, about 40 miles northeast of Porterville, and includes the Tule ranch 14 miles from Springville. John M. Nelson has been elected recorder. The boundaries commence at the southwest corner of Section 33, Township 20 South, Range 31 East, and runs a northeast course to the summit; thence northerly on the summit on the dividing range of the waters of Kern and Tule, passing the waters of Mountaineer, Alpine, Soda creek and Little Kern, taking the divide between Big and Little Kern to the mouth of Little Kern; thence west on the Standard line to the place of beginning.

The district is well watered and well timbered. There is about a full township of the mineral deposit, mostly iron and limestone bases. The ore as yet developed is low grade, but evenly distributed and free from rebellious ores. The surface ore is of low milling grade, going from \$2 50 to \$4 per ton.

Eight or ten parties have made locations, among whom are Dr. Todd Martin and others of Tulare, Crowley Brothers of Visalia, Garner and others of Red Bluff, and the Gilliams of Porterville, Dr. Hathaway of San Luis Obispo, and several others of Tule river and elsewhere.

There is two feet of snow on the ground, the altitude being about 9000 feet, the trail not being very safe for travel without a guide. Mr. Nelson and others are trying by engravings to raise a fund to make a good trail, in anticipation of the amount of business likely to be passing between Porterville and the mines of the district the coming spring. The immense quantity of paying milling ores lying about the surface is a pretty satisfactory indication that there is an immense body of rich ore lying under and near the surface which will, with plenty of timber and water at hand, promise to make a district of great importance in the mining world.—*Monarch Tidings*.

Hunting for Coal.

The high price of coal in the San Francisco market at the present time has evidently agitated the work of discovering coal deposits in California. At all events, prospectors have gone to work in a dozen localities recently. Two companies have been organized to prospect for coal in San Mateo county, where small deposits have been known for several years.

It has been learned that at Carmelito, in Monterey county, a coal chute with a capacity of 250 tons will be erected. The chief engineer of the California and Nevada road, with a corps of assistants, is at present engaged in making an survey for a railway to the coal mines. Coal of excellent quality is said to exist in the mine. The latest reports from Covelo, near Ukiah, state that there is no longer any doubt of the evidences or extent of the coal deposits in the neighborhood of Round valley, in Mendocino county. The deposit, it is said, is larger than any yet found on the Pacific Coast. The coal vein in Mendocino county is known to extend north for nearly 60 miles into Trinity and Humboldt counties. In many places the vein has been found to be 20 to 30 feet thick. More than two-thirds of this new coal-field belongs to the United States Government, being located on the Round Valley Indian Reservation, which is now being appraised by a commission appointed by President Harrison.—*Chronicle*.

Mapping the Death Valley Region.

As a result of the expedition to explore Death valley and the contiguous country, many new species of mammals are being received by Prof. Merriam of the Agricultural Department, and the work has only just commenced. This exploration has nothing to do with the Geological Survey, so that all the stories about searching for lost mines and fabulous treasures of precious minerals are absolutely without foundation, as the object sought for is simply to trace out the life zones and embody the result of the observations in an elaborate report with maps that will be of great benefit to this and future generations. Twenty thousand square miles of territory will be surveyed this season, taking in parts of Kern, Inyo, Tulare and San Bernardino counties in California, and a small corner of Nye county, Nev.

Death valley forms a small part of the territory laid out for the season's operations, and it will be completely covered during the winter months, so that the distressing heat of summer may be avoided. When the temperature becomes intolerable on the sandy wastes of the desert, Prof. Merriam's men will rise to the higher altitudes of the parallel mountain ranges on each side of the valley, all a terra incognita so far as things agricultural are concerned, including Mt. Whitney, the highest peak in the United States.

When they have gone over the ground thoroughly and made the necessary experiments, they will issue maps, showing the different life zones in colors, with another series of maps showing the special species and groups of species, also in colors, so that when it is proved that a country is habitable and the ground susceptible to profitable cultivation, farmers will be able to turn to these maps and trace out just where they can raise certain things without being put to the expense of costly agricultural experiments. The causes which led to the distribution of animal life serve to indicate the distribution of crops, and Prof. Merriam will be able to tell with great accuracy what will thrive at certain altitudes, on certain slopes, under certain conditions. His purpose is to map all of the Western United States in this manner.

With reference to this particular section, the professor says that owners of comparatively small farms can locate their lands so as to take in two or three distinct life zones, giving them opportunities to harvest various crops at almost all seasons of the year. Prof. Merriam will leave for California about March 1st, in time to join his two parties of explorers when they have come together in Death valley, preparatory to going to the mountains. One party has already entered the unknown country from Nevada, and the other should leave a point in San Bernardino county in a day or two, working northward.

This expedition will be by far the best ever fitted out by the Government for a similar purpose. In its personnel it is unequaled, men composing it standing prominent in their various branches of science. Vernon Bailey, the second in command, has been chief field naturalist of the United States for four or five years, with a large and valuable experience in the West, both the summer and winter. He is accounted the best collector of mammals in the world, and one of the very best field naturalists anywhere. He was assistant to Prof. Merriam in the biological survey of Arizona two years ago and was with him in Idaho and Nevada last season. Like his chief, he is not content with sitting in an office in Washington, but must be in the field, where the work involves great hardship and much privation, besides arduous labor.

T. S. Palmer of California, and one of the best all-round men in the service, is the man in charge of one party, and Prof. Merriam relies upon him for much of the success of the expedition. He is assisted by E. W. Nelson, who spent five years in Alaska and published a quarto report of his travels, which includes a sledge journey of 3000 miles alone with his dogs and a native guide. During this journey he ruined his health and was forced to live in California.

Dr. A. K. Fisher of New York will be the practical man of the outfit, being an expert at trapping animals, shooting and snaring birds and preparing skins. Besides, there will be a botanist of note, and instruments will be carried to make accurate topographical surveys and measure altitudes. Prof. Hinton, Chief of the Irrigation Department, is trying to arrange his affairs to join the party, and if he succeeds he will be a valuable acquisition. No effort will be made to look for gold or silver, as it is purely an agricultural, not a mineral, project.—*Chronicle*.

TO DIG FOR PETROLEUM.—A lease for 9362 acres of land lying in the Matlatz valley, near Eureka, Cal., comprising portions of the ranges of J. Chambers, O. Freeze, C. A. Johnson, C. A. Miner, J. Walker, D. Zanani and C. Miner, was filed for record recently. The lease is given for 50 years, and the lessees, C. A. Barrow and Irving Foulke of Ventura, agree to develop the petroleum supposed to be abundant in that section. One well is to be sunk within three years, and others to follow. The lessors are to have ten per cent of the net proceeds of the oil. Provision is made in the event of discovery of other minerals.

For Reducing Ore.

The lonely-looking structure on the south bank of the channel below the Crown mills has been a puzzle to many persons who have observed it. That shed is the nucleus of what may be a great manufacturing enterprise in the near future. It is a place where J. R. Moffit is perfecting his invention for reducing refractory and other ores.

The machinery for the purpose, which is nearly perfect, is very curious yet very simple in principle. The first device might be called a triple furnace. It consists of two cylinders, one inside the other, and over the furnace proper. In the inner cylinder the ores are placed after being reduced almost to a powder by a crusher. The inner surface of this has ridges a couple of inches apart and about half an inch wide. The outer cylinder is filled with wood, and when both are filled they are tightly closed so that no vapor can escape. Fire is then raised in the furnace and the heat is raised by a pressure blower, which maintains it in the proper degree to char the wood in the outer cylinder and fuse the ores in the inner chamber. While this process is going on, the inner cylinder with the ore is made to revolve, while air is introduced into it from without. The ore being lifted by the ridges falls from them when near the top, when by the burning of the oxygen of the air the heat is raised to the fusion point and the ores reduced to ashes.

When thus reduced the ashes are forced into a tank of water where they are held in solution and drained off while not a particle of the metal is lost. In a report of the Superintendent of the Mint in San Francisco some years ago it was estimated that gold and silver worth \$85,000 had been carried up the smokestack and wasted in one year by the draft required in the ordinary process of fusing those metals. All of Mr. Moffit's processes being performed under pressure, no vapor escapes. In the process of reduction the metal is necessarily reduced to particles so minute that an idea of their lightness may be gained from gold leaf, which, though a breath may blow it away, is not so light as the infinitesimal particles to which his process reduces the metal.

From the tank where the precious metal is precipitated, it is transferred to an amalgamator where it is gathered by means of quicksilver, the process of which is familiar to those who know aught of mining and its kindred industries.

By the Moffit process a vast amount of ore that will not now pay to work can be made profitable. Hitherto, very low-grade and refractory ores have been unprofitable by reason of the waste which this process saves. It is quite as well adapted to rich ores because the process is as ready as any other, while saving so much of the product.

Mr. Moffit is not a novice or a speculator in these matters. He is an experienced miner and metallurgist, and has been almost the only successful prospector of river mining on the Tuolumne, where he has lived many years. He is the owner of valuable property in Tuolumne county, and is the builder of what is known as Moffit's bridge, on the Yosemite road. He has conducted his mining operations there on a large scale. He constructed a dam 36 feet high and carried the water over his mining property through a flume 900 feet long. He had invested a large amount of capital and had gotten down to pay-dirt, where he was taking out \$1000 a day, when a freshet of unusual suddenness and volume came down and washed away his work.

Last year he returned to the work undiscouraged and put in a permanent dam which no freshet can injure, and next season will resume operations.

His inventions, which are protected by patents issued in 1885 and 1890, will be ready to be put into the mines during the coming year. He is not seeking to sell territorial or manufacturing rights or any share in his inventions. It is his intention to establish a manufactory in Stockton, make the machines and let them out to miners on a royalty. Though very little public mention has been made of the inventions, mining experts seem to have learned of them, and Mr. Moffit has numerous visitors, all of whom are highly pleased with them and have high expectations of them.

The introduction of the Moffit machine into the mines of California means a vast increase in their productiveness and a proportionate increase of the wealth of the State. The establishment of shops for their manufacture in Stockton will add another and very important feature to the manufacturing industries of the city.—*Stockton Independent*.

IRON MOLDERS' UNION.—This organization has elected officers for the ensuing six months, as follows: President, Joseph F. Valentine; vice-president, George H. Lubbart; recording secretary, Richard Barnett; treasurer, Thomas Haly; inductor, Charles McLaughlin; door-keeper, F. Herlitz; Executive Committee—E. R. Harper, Joseph Barnes, James Ferguson, Wm. Potter, Thos. Dixon; Auditing Committee—J. D. O'Neil, J. de Suoca, A. McDermott.

LEDGES containing gold and silver have been found in the mountains between Glen Ellen and Napa Valley. After the experience of finding gold in the coast range at Los Barros, Monterey county, it may be that good claims will be developed at the new finds in Sonoma county.

Wild Flowers.

[By MISS LILIAN HOWARD, of Santa Cruz.]

The great mass of wild flowers form the unconsidered trifles of our fields and plains. They owe no thanks to man, for he does not care to perpetuate them, neither have they fear of him, for they do not, as a class, infringe upon his domain. A few may please him by their brilliancy of coloring, as they grow in masses and blend harmoniously with some pleasing landscape; their patches and bands of blue and white and their long stretches of gold and orange may compel attention and even admiration. A few may please the casual observer by the beauty or peculiarity of their forms, as in the case of the rose, the lily, the dicentra, and the lady slipper.

A few have become general favorites on account of their extreme delicacy of form and color, as the baby blue eyes and the lily bell. But it remains a melancholy fact that the popular expression is a cynical smile and a suppressed murmur of weeds, when the subject is broached.

Well, there are weeds and weeds. A few of our flowers have become so-called outcasts, and lift their dainty cups rather sadly, without receiving an admiring glance, except from some misguided botanist, or maybe a sentimental but unsophisticated young lady, who is informed with a covert smile that she may have a whole county full, and welcome, if she will only pick them out. The blind weed, red sorrel, and the so-called yellow hell-trope may serve to point a moral and arouse a smile at the expense of an enthusiast.

Weeds? And how different they really are from weeds. The real weed is as much of an aristocrat as wheat or corn, and usually gets the same amount of cultivation. He lives by his wits, but gets the best the land affords. Of course we do not mean the kind one that peeps up along the wayside, or in neglected fence corners, or takes unto itself a bit of waste land, to be cast out the first time the soil is turned by the plow. We mean the kind that tries to take the whole farm, wants to grow in the mellowest soil, overshadows the young crop above ground, and sends out millions of little roots to choke it off underground. The flowers are inconspicuous, that it may not waste its substance in show. Its seeds are produced in countless numbers, and of course they are ripened and scattered before the crop is ready to be gathered. These seeds are furnished with quaint devices for preservation and dissemination, as hooks to catch the coats of passing animals; little hooks to anchor themselves to the ground or other weeds; twisted awns with bristles, to cling to the ground; down, that will float them far and wide on the breeze; and lastly a bitter or nauseous taste, or a gummy coat, to discourage the browsing propensity of animals. Whatever plan man or beast contrives against them, they try to meet it in time with a cunning device for defense, so after a long and relentless war, our most troublesome weeds are developed.

Their vitality has furnished subject for epigram and moral in all ages, and the longer they have contended against man, the more exasperating they are. For it is a well-known fact that the strong, aggressive weeds of older settled countries overtop and thin out the weeds of new countries which have not been compelled to fight for their lives. So weeds are as much the result of selection as the giant pansy, rainbow rosea and Japanese chrysanthemums of the horticulturist. Then our flowers being the results of modifying circumstances and conditions through a long course of years, whatever serves as a distinguishing mark in our cultivated as well as our wild species is the sign to tell the story of their lives to him who reads.

But there are always two sides to a story, and if the thistle and the cactus could tell of their wrongs, no doubt the story would reconcile us to their prickly skins. If, as I said, imitation is the sincerest flattery, what intelligence we must grant some of the wild flowers of our hot, dusty plains and hillsides. There grows the Mexican poppy, with spines and needles that would outstick a Canada thistle, and with the same dusty, white-downed leaves as its thistle neighbor. A casual observer would readily mistake it, and it is only when the glory of its delicate white blossoms are unfolded that the cheat is discovered. Who and what was the enemy against which the cunning flower fairly first armed itself? That its defense is secure, the rash investigator can mournfully testify.

There must have been a wonderfully omnivorous beast of the field prowling these plains in those old days, or it must have been a much starved one, for this poppy is not the only plant which has bare thorns armed itself. A species of wild sage has adopted the same livery, and pushes out its curious long blue corollas with its salmon pink anthers, from a bristling droile of prickles that would do honor to any thistle. Blue is the bee-color fortunately, and I am sure no other creature would willingly take the out-post for the sake of the treasured honey.

The mentzelia is a co-resident of these advanced thinkers, and is almost converted to their ways; it is not quite so dusty, not so prickly and much more showy than its neighbors. Protection is their motto, for on those wide stretches of dry country, the race is to the one who will not be eaten, and to the one who will not be killed by thirst; so the object of their little lives is to store up their moisture, to hide themselves and to be unpalatable when found.

But our most beautiful wild flowers are found

in our fields and in the borders of our forests, as the popularity of our creamcups, nemophilas, giliae and lupines shows. Our lilybells, too, are a revelation in themselves, and an open hillside with yellow calochortus, Johnny jump-ups and pink mallows is a feast for all eyes.

But the snowy lilybell is our poem; in color, in form and in manner of growth it appeals to us, and though usually called by an unpoetical name (harebell), it is still the one treasure of our fields most valued. It varies in color from a deep, dull crimson to a clear white, tinged with pink and green, and the pretty bells hang in clusters of from three to ten on their slender stems. Then its cones of all colors, the golden lilybell or Diogenes' Lantern, the many-colored Mariposa lily, the white clustered variety with its long leaves, and the pale-lavender variety, are almost as interesting as itself, and furnish many a suggestive page for the paragraph, the sketcher and the poet.

In fact, the lily family is well represented in our State, and our fields can vie with our gardens in presenting this most graceful flower. The tiger-lily, the white Washington lily and some smaller varieties remind us in a dignified way that Dame Nature is still in the race with man for horticultural honors. The eagerness

oant in size, but even the least has a right to its name.

In one case I saw in a widely advertised collection of wild flowers, a flower-cluster nearly three inches long, bright scarlet in color, labeled with the name hurr-clover. Of course one does not wish to be too particular, but the line must be drawn somewhere, and a reasonable amount of accuracy is not to be despised.

Many of our beautiful and effective plants have no common English names, and it is so easy to prefix wild to some familiar name and so band it down—a delusion and a snare to all hotanically inclined students. Most of our native flowers probably have Spanish names and musical oases, too, given by the people who have lived with them, have seen, with a poet's eye, their many charms, and have had many tender associations connected with them. These names we should preserve as far as possible, for they are usually pointed, picturesque, and perpetuate the traditions of the soil. Our madrona and manzanita are good examples of this class of names, and they seem to be popular; others, as chloolote, yerba buena, and yerba santa, are fully as pleasant to the ear.

Leaving aside these flowers as denizens of the field and of the wood, and viewing them in the

even our common hockeye with heavy blue-green foliage, would prove invaluable if properly managed. The madrona, the tree-like manzanita and the laurel have already been tried and have been heartily approved. They belong to our climate and can be disposed of in landscape gardening with as much grace and relief as the foreign tree.

For a long time it was the style to adore wild flowers, but a careful observer could see that all who adored them chose the largest and brightest or those most easily obtained; the true flower lover then as now guarded his treasures with a somewhat jealous eye.

The popularity our flowers enjoy in other places may be only another proof of the old proverb, "A prophet is not without honor," but the interest shown in the recent field flower contest among the pupils of our county proves that we do not need to hear from abroad before learning to value our home treasures.

Our State Flower.

We give on this page a portrait of our new State Flower as adopted at the last meeting of the State Floral Society.

The announcement of this action has been followed by approving comment in the public press, and in such conversation as has come to our ears. This flower of the whole year and the whole State, and in its typical species, only of the State, is by common consent crowned as the queen flower of California.

Our engraving has a botanical rather than an artistic cast. Perhaps at another time we may present a prettier picture, but just now it seems desirable that our distant readers should know just what sort of a flower has been given the scepter in California, and this can be best shown by the botanist's heartless method of analysis. Fig. 1 shows the full bloom, the style of the leaf and stem, also the pointed seed-pod, which Fig. 2 shows as opened when still green, and Fig. 3 presents the pod as it naturally opens when dry and mature. Fig. 4 is the upper part of the seed-pod before opening. Fig. 5 is a seed magnified and Fig. 6 is a section of the same, showing the germ, while Fig. 7 shows the germ more highly magnified. Fig. 8 shows how the stamens are attached to the petals of the corolla, and Fig. 9 is a cross-section of the unripe seed-pod.

In connection with the engraving which will introduce our State flower to those who do not know it, we cannot do better than reproduce the closing paragraphs of Miss Pratt's essay, read at the November meeting of the Floral Society, which well portrays some of the characteristics of the flower that entitle it to the distinction it has received:

In choosing a floral emblem for a State, it is desirable that the flower should be a native, and not only widely distributed but striking, so that everybody may thoroughly know it, and that it will be among the first to attract the attention of the children and so connected with their earliest memories, but that it should be beautiful, easily represented in paintings, carvings or architectural designs; and for this State it seems specially desirable that the flower should be golden in color. All these requirements this little blossom fully satisfies. The typical flower is found only within our borders, though varieties occur as far north as Washington and southeast to Texas—about 10 in all, varying in manner of growth, color or both; but the Eschscholtzia, as we know it, is never found outside of our State. One has only to watch the children coming home from a trip to the country to see which flower they love best. It is one of their greatest delights to pick a whole armful, and the quantities the florists gather and bring to the city show that the older people fully appreciate their choice. No other California wild flower is so widely known or so highly prized as this, and surely no other has been painted so many times.

Both flower and foliage are well adapted for carving or decorating our buildings or banners, and who can describe its color? All the golden emblems of the State combined seem to be needed to give this wonderfully glistening, brilliant, intense coloring, which after all can never be represented, and, like so many other wonders, people must come here and see to fully appreciate.

STATISTICS compiled by the *Railway Age* show the construction during 1890 to be about 6080 miles, as against 5200 last year. Over 2000 miles of road under construction are in the Southern States and over 1000 in the Northwestern States. The Northwestern show 1057 miles, due largely to active building operations of the Northern Pacific and the great Northern roads.

FIFTEEN HUNDRED employees at the Pullman Works who work by the piece in the car-shops have been notified of a new scale of wages, to take effect on the first of the year, amounting to a reduction of about ten per cent. Two hundred blacksmiths have quit work, pending arbitration with the company. The other employees seem inclined to accept the scale quietly.

THE property of the Benton Consolidated M. Co. was sold on Saturday last by the sheriff under an execution on judgment in favor of the Alta M. Co. The property was bid in by the plaintiff at \$9666.70. Under the law the Benton Company can redeem the property within six months.

OUR STATE FLOWER. THE CALIFORNIA POPPY — *Eschscholtzia Californica*.

with which plow-goers storm the preserves of the tiger-lily is a lasting tribute to its beauty and grace. But—alas! the cow is just as fond of it, and only what they cannot reach is left for the human flower-lover. We respect the craft of the thistle now, and wish for armor for the lily.

In our hasty survey, we can pay only a passing tribute to the beautiful members of the pea tribe which flourish among us. In richness of color and in variety they are surpassed by few other flowers, and as it is always a pleasure to see a well-known face in a crowd, so we are glad to come across the familiar butterfly petals in a wilderness of new plants. The lupines, yellow, white and all shades of blue and purple, with occasionally a pink stranger, the clovers, the vetches, thermopsis and a host of kindred with most unusual names, are among the gems which brighten our fertile land.

On the subject of names let me present a brief plea. One is debarred, of course, from speaking of the scientific names; they are settled, and as far as one can judge, well settled. But the local names, the home names, are insufficient and so loosely applied that it is simply exasperating to try to verify many of them. There are a number of pretty names afloat which are applied to many flowers, as blue bells, wild pansy and wild forget-me-not, and there seems to be no particular flower that can prove its claim to the name. For instance, the name wild heliotrope is given to several widely varying plants, and there is a true heliotrope, rather insignifi-

sacrilegious light of transplanting, our query is: "Which of these are suitable for cultivation?" This question has been answered for us in a great measure, for in many catalogues of Eastern growers our flowers are well represented. Among them are the California poppy in its yellow and gold and its developed cardinal cousin, the nemophila, in all shades and sizes, the limnanthea and the Mexican poppy, which has recently become a favorite, while the Romneya Coulterii, with its great orange-like white blossoms, has won a lasting reputation for itself.

The tiger lily, the azalea, the rhododendron, where it will bear transplanting, the spires, the clematis and the scarlet gooseberry, under the ambiguous name of coral plant, have already enriched our gardens, and where one can withdraw himself from the worship of varying forms of our common garden flowers, he will find these most charming companions. They give a wild, airy air to a garden, but it must be acknowledged that they look as if they felt degraded and longed to escape.

The salmon berry, with its red flowers and luscious-looking fruit, seems to be challenging one to a feast worthy of the gods; maybe the gods could eat them, but at present they are rather sour for the human palate. Culture ought to do something for them.

In our forests grow trees and shrubs that would lend themselves favorably to artistic gardening, as the chinquapin, with its gold-lined leaves, the California nutmeg or yew, and

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

PIONEER.—Amador Ledger, Jan. 3: For the last three weeks prospecting operations have been carried on at the Pioneer claim, which adjoins the Kennedy on the south. The old shaft, 70 feet deep, has been cleaned out, and drifts run north and south. About 60 tons of quartz has accumulated on the dump. In the north drift the ledge is four feet wide and in the south drift, from one to two feet in width. The ore is reported to be of fair quality. The ledge matter in the North Star has again been struck and the hopes of the stockholders are once more in the ascendant. The Amador mill, running on ore from the Doyle claim, has come to a standstill. A cleanup has been made, but the exact amount obtained we have not been able to learn.

PLYMOUTH.—The Plymouth Consolidated is working along as usual. The New London mill keeps crushing away. The mine keeps digging out enough quartz to supply the mill; how it yields I am not informed, but very likely the ore is low grade. The War Eagle mine, operated by George Lamb & Co., is drifting and report says that they are taking out some pretty good rock. There is a good deal of assessment work being done, which helps to keep a little life in the town.

VOLCANO.—We learn that Mr. Fink has sold his claim, situated two miles east of town, to a company from San Francisco, the purchase price being \$20,000. Machinery is now being erected on Antone Reale's claim in Forty-nine flat; a dozen or more men are employed there.

Calaveras.

GOLD.—Mountain Echo, Jan. 1: A piece of gold weighing less than a pound was picked up in the road near Chinatown last Monday. Owing to the breaking of the Union Water Co.'s ditch in the mountains the Uteca mill has been closed several days during the week, but was started up again last Tuesday. We are informed that the Bruner mine, located near Albany Flat, about two miles from this town, has been bonded to a San Francisco company, and that the company will proceed at once to develop the property.

Mariposa.

GUIDING STAR.—Union Democrat, Jan. 3: A visit was lately made by Dr. Gould and Messrs. Stanley, Lindley and Blanding to the Guiding Star Mine, in Mariposa county. The ores taken from the several openings on the mine show well in free gold. The vein is of good size, the formation is slate, and all the indications point to permanency. The owners have given Messrs. Gould, Blanding and Stanley a bond on the mine. They think well of the prospect for a profitable mine.

Nevada.

THE OMAHA.—Grass Valley Union, Dec. 31: Since the addition of eight new stamps to the Omaha mill, making 28 in all, a great deal of quartz is being reduced. Of the full head of stamps 18 are running on ore taken out by the regular force of miners and eight on the rock of the tributaries. There is plenty of fine rock in the Omaha, and the average yield per ton for the past year has been higher than that of any other mine in the district.

BANNER.—Nevada Transcript, Dec. 30: J. E. Brown, manager of the Nevada City water works, who has for several months past been in San Francisco, will come back here as soon as he is able and resume the work of reopening the rich old Banner quartz mine, which enterprise has been temporarily interrupted by his ill health.

GREASED THE ORE.—Transcript, Dec. 27: Wm. Berry, working on tribute at the Gold Tunnel mine in this township, recently took out a crushing of such ore as ordinarily yields \$45 to the ton. He sent it to mill, and the crushing yielded only about half as much bullion as it should under favorable circumstances. An investigation showed that some malicious person or persons had "greased" the ore before it was hauled away from the mine, and a large part of the gold had been washed away in the amalgamating process.

THE ORIGINAL EMPIRE.—Grass Valley Telegraph, Dec. 26: The owners of the Empire mine have reasons to be glad this Christmas-time, for never, in the history of that famous old mine, has such rich ore come from its depths. This morning the miners ran on to specimen rock in the 1500 level and they were taking out specimens up to about noon. What they did this afternoon we have not been informed. One piece of quartz alone, taken from the mine this morning, is valued at \$1000, and it is stated the whole amount reached will foot up into the thousands. The Empire is the oldest worked quartz mine in the county.

Plumas.

GRAVEL.—Cor, Greenville Bulletin, Jan. 3: Mr. Swiggett, who is in charge of the Slate Creek mine, between here and Spanish Ranch, has a full crew of men at work and the tunnel is being pushed along rapidly. Gravel is expected pretty soon. The Hungarian Hill boys are running a tunnel. They are in a good deposit of gravel.

San Bernardino.

TIN.—Inyo Independent, Jan. 2: O. I. Mairs of Independence took a trip from Bakersfield to the tin mines in San Bernardino county, not far from Riverside. He says a very large amount of capital has already been invested in developing the mines. Extensive buildings are erected, the best of machinery is there, good roads are made, and what is of most importance, the mines are well developed. He was assured that there are large bodies of tin ore in sight richer than the ore of the mines in England. Everything indicates mines of great extent and value.

San Diego.

THE HELVETIA.—Julian Sentinel, Jan. 2: Since Mr. Havermale has taken charge a ten stamp quartz mill has been erected and is now in running order, and being run on ore from the High Peak mine, which he is also prospecting. He has two 40 horse power hoists, hoisting machinery, two engines, a 10 horse power for the hoist and a twenty horse power for the mill. All the machinery is inclosed in good buildings. He has built a retort, assay office, blacksmith shop, two 10,000 gallon water tanks, a resi-

dence and office, hoarding and bunk houses and a barn. The new shaft is down over a hundred feet. Large bodies of ore are known to exist in the old works, and Mr. Havermale is rushing the work of getting it out. He is also spending considerable money in prospecting the High Peak mine, which he will purchase provided it proves satisfactory. He has twenty-six men on his pay roll, and pay days are as regular as clock-work. When the mine is properly opened he will employ 60 or 70 men.

Shasta.

DOG CREEK.—Shasta Democrat, Dec. 31: Joe McCourt, a miner on Dog creek, was in town last Saturday. He gave us a good account of the mining developments in that camp. There are in all 30 claims located, all of which prospect more or less. Considerable development work has been done on several of them in the shape of shafts and tunnels, which have encountered pay chutes of good ore. A recent discovery on the head of Chase gulch by Asa Elson and T. O. Roberts is said to be great, the croppings of which yield hand-mortal rock. Mr. McCourt showed us specimens of gold telluride ore taken from one of the mines that is very rich. The showing in this camp indicates that a number of big bullion-producing mines will be developed there the coming summer. We are informed that the Brown Bear Co. of Deadwood is negotiating for a group of claims there, and if this company should take hold the camp will boom.

FOUND IT.—Courier, Jan. 3: David Pesenti, who some time ago sold mining property to Dr. Garlick, recently purchased a "prospect" from another person, on a two-foot ledge on surface, situated on a hill above Dry creek, north of town. David is a worker from the start and strong as Goliath of old, and set to work developing his claim. He has run a tunnel in, which taps the ledge 30 feet below the croppings, and finds the ore at that depth looking fine, and the wall rock well defined. The ore assays \$87.90 gold and \$2.40 silver. The owner has run a 30-foot crosscut on the ledge, and named the claim the Live Oak.

Slakiyou.

QUARTZ.—Yreka Journal, Dec. 31: Messrs. Lawson & Fahl, who have been working a newly discovered quartz ledge on Old Craggy mountain, in the Humburg creek district, had a cleanup last Thursday of a quantity of quartz crushed, and were very well satisfied with the yield. They will continue the work of opening the claim in a systematic manner, and secure another batch of rich quartz for crushing when the roads are good for easy hauling, or sufficient snow is afforded for good sleighing. The Spencer mine at Humburg still continues to improve in extent and richness, as work on the ledge progresses. This ledge is destined from indications at present to become one of the richest paying mines on the coast. Lee, Lash & Co., continue to find an extensive deposit of blue gravel in their claim on Greenhorn creek, about a mile south of Yreka, having traced it a distance of 40 feet, at 80 feet below the surface, and varying from 5 to 7 feet thick. They are now sinking the pump shaft 4 feet deeper, so as to drain the gravel to better advantage, and have also set up hoisting machinery, which can be worked by the engine pumping out the water. The blue gravel wherever found in the county has proven exceedingly rich, and is an underlying strata existing throughout all Northern California and a large portion of Southern Oregon. A carload of quartz has been shipped to San Francisco from the Spencer mine on Humburg, via Yreka, as an experiment, to ascertain how much better it will pay by more scientific working in that city. Should the experiment prove profitable, it might be the means of an extensive business for the railroad company, which ought to make a low freight rate for mineral ore, as the Central Pacific granted the silver miners of the State of Nevada. There are numerous quartz-mills in this county, from which the finest gold escapes, but could be saved if we only had chlorination works to reduce the sulphurets and gold to a liquid state. Several lots have been sent to San Francisco that paid very rich, it being impossible to save the finest gold on the quartz-mill plates, especially at ledges where the influence of quicksilver is neutralized by arsenic, soda and alkalies in the mine.

Tuolumne.

NOTES.—Cor, Union Democrat, Jan. 3: The App mine, situated at Quartz Mountain, on the mother lode, is, so we are informed, paying well. The last run yielded \$33 per ton, with a large quantity of rock equal in richness in sight. The Dutch mine, an extension of the App on the north, is also looking well, some of the rock being rich enough to pay working it in a hand mortar. The new ten-stamp mill on the Hyde mill is near completion. Some very rich rock showing heavy coarse gold, taken from the pocket lately found in the Cosmopolite mine, near Groveland, was brought to Sonora a few days ago. The parties having the lease on the mine from Mrs. Dorsey are confident of good and lasting profits. Machinery for the new shaft on the Buchanan mine passed through town last week. At the Golden Gate mine an experimental test is being made with a Garnier concentrator. If the result is satisfactory, it will be accepted. The Kanaka mine and mill are now in condition for work. The mill will start as soon as sufficient water is obtained and this will be very soon, for our winter rains have come. The Badger mine in this county, situated nine miles west of Sonora, is being energetically worked. The San Francisco parties who have a bond on the mine are reopening the old shaft, and at a depth of 170 feet have found very rich rock going into the hundreds of dollars per ton. The vein at this depth is five feet in width. The north and south extension of the mine also show well. The Badger mine was worked years ago with profit to the owners. The ore below became heavily sulphureted and for want at that time of some practical, economical mode of treating the sulphurets, the mine was abandoned. The want no longer exists, for sulphurets ore are now worked to a high percentage of assay value by simple methods at small cost per ton.

NEVADA.

Eureka District.

THE DIAMOND.—Eureka Sentinel, Jan. 3: Several loads of ore have been shipped from the new tunnel. The main tunnel is still being driven ahead and does not deviate to the right or to the left. The hunches and stringers of ore that have

been encountered are encouraging, but there has not been sufficient prospecting done to determine their extent.

THE WIDE WEST.—Major Kinney has for some time been carrying on prospecting work at the Wide West. He has finally concluded to suspend operations there until spring. Accordingly the men were knocked off during the week.

ORE SHIPMENTS.—During the week the Eureka and Palisade Railroad Co. shipped 95 tons of ore to the Salt Lake City smelters.

Washoe District.

OCCIDENTAL.—Virginia Enterprise, Jan. 3: The work of repairing the track and timbering is progressing with all possible dispatch. The south drift from the bottom of No. 5 winze on the 650 level is in 74 feet, and continues in low-grade ore. Milled during the month of November 1440 tons of ore of the average value of \$20.45 per ton, from which was produced in bullion and concentrates a total of \$25,879.

SILVER HILL.—On the 160 level the northeast drift from the winze continues in porphyry.

CON. NEW YORK.—On the 850 level the north drift from No. 1 crosscut is still being advanced in a porphyry formation. On the 1100 level the north drift is passing into a mixture of quartz and porphyry.

OPHIR.—Some milling ore is still being obtained from the west drift, 122 feet below the 1300 level.

MEXICAN.—East crosscut No. 1 on the 1465 level is still in very hard rock.

ALTA.—The mill is still kept running to its full capacity, crushing about 300 tons of \$18 ore. The usual amount of prospecting work is being done.

YELLOW JACKET.—Are extracting and milling about 300 tons of \$18 ore a week. A good deal of exploring work is being done.

CHOLLAR.—Are sinking a winze on the 750 level to connect with the 850 level. Extracted and sent to the mill the past week 545 tons of ore; average battery assay, \$21.65 a ton.

EXCHEQUER.—East crosscut, 150 feet south of north line, 500 level, is out 366 feet; face in clay and porphyry. East crosscut near the south line, 600 level is out 210 feet; formation, quartz, porphyry and clay. South lateral drift, 600 level, is out 625 feet, face in quartz and clay.

ALPHA.—The east crosscut, 70 feet north of shaft, 600 level, is out 240 feet. Face in black porphyry.

POTOSH.—The south drift from the main incline on the 1230 level is in 185 feet; face in quartz giving fair assays. The south drift on the 1300 level was advanced 33 feet; total length, 458 feet.

ANDES.—During the past week north drift, 420 level, was advanced 15 feet through a formation of porphyry and clay. South drift, from main west drift, 420 level, was extended 10 feet; formation, clay and porphyry.

CON. CAL. & VA.—Ore continues to be extracted from the 1200, 1300, 1500, 1600 and 1650 levels. A considerable amount of exploration work is also being done in the mine. About the usual number of tons of ore will be sent to the Eureka mill, and averages a little over \$18 a ton.

UNION CON.—No. 2 crosscut from the north lateral drift on the 1465 level is being advanced in a soft and favorable porphyry formation.

SIERRA NEVADA.—The northwest drift from the 630 shaft station is making good headway in a porphyry formation.

HALE & NORCROSS.—On the 800 level the west crosscut was advanced 20 feet, making a total of 205 feet, face in porphyry and seams of quartz. On the 900 level the west crosscut over north boundary was advanced 15 feet in hard quartz giving low assays. This crosscut is now extended 70 feet; face shows some water. On the 1100 the north drift was advanced 15 feet, making its total 230 feet; face continues in hard porphyry. The northeast crosscut on this level was advanced 20 feet, making its total 200 feet. We have saved 11 cars of ore from this crosscut during the week.

SAVAGE.—During the week we have hoisted 639 cars of ore from the 300, 400, 500, 600, 750, and 1300 levels. Shipped to the Mexican mill 553½ tons; ore milled, 620 tons; average battery assay, \$16. We have bullion on hand amounting to \$27,692.10. The winze station in the ore body from the track floor, 1300 level, is down 30 feet and continues in ore of good quality. We have finished the station for a hoisting engine at the top of the winze. The engine hoist is in place and we expect to have it running in a few days.

SEG. BELCHER.—The south drift from Belcher shaft, 600 level, is now out 20 feet from Belcher south line, face in porphyry.

JUSTICE.—The north drift, 822 level, is out 171 feet and is in hard rock. The north winze, 622 level, was sunk 10 feet the past week and is now down a total depth of 18 feet; bottom in good milling ore. Shipped 160 tons of ore; battery assays, \$22.46.

KENTUCK.—The week has been occupied in timbering the tank station on the 167 level and grading down the east drift on the 1000 level to correspond with the Crown Point drift on the same level.

CROWN POINT.—Are extracting from the 1800 stoppe from 8 to 10 tons of ore per day that assays from \$18 to \$20 per ton.

CONFIDENCE AND CHALLENGE.—The joint Confidence and Challenge north drift on the 300-foot level is now in 130 feet, 20 feet having been made during the week. The face still shows two feet of fair ore. The joint Confidence and Challenge raise from the 750 level is up 106 feet. The top is in quartz having no value. Work on the main north drift on 1100-foot level has been suspended for the present, and from its north end a west crosscut has been commenced, which is in 28 feet. The face of this crosscut shows quartz having no value.

WEST COMSTOCK.—Good headway is making in the construction of the road leading from the lower tunnel to the Ophir grade.

UTAH.—The north lateral drift is still being advanced in a formation consisting of quartz, clay and porphyry.

OVERMAN.—Extracted 424 tons and 1600 pounds of ore. Shipped to the Brunswick mill 443 tons and 1900 pounds of ore. Battery assays average \$16.55 per ton.

CON. IMPERIAL.—West crosscut No. 2 on the 1000-foot level is now out 248 feet. The face is in quartz having no value. A great deal of work is being done on the other levels of the mine in following up and taking out small streaks of ore.

BELCHER.—West crosscut No. 1 from the shaft is out 461 feet, having been advanced 11 feet during the week; face in quartz and porphyry. The south

drift from crosscut No. 3 has been advanced 20 feet during the week, making a total distance of 58 feet; face in quartz and porphyry showing spots of ore. Work in the crosscut on the 1400 level has been discontinued and a raise started from this level to connect with the winze from the 1300. The raise is up 10 feet; face in quartz giving low assays.

BEST & BELCHER.—800 level: West crosscut No. 2 has been extended 14 feet; total length, 396 feet; formation, porphyry, with streaks of quartz, 1200 level: At a point in upraise No. 1, 100 feet above this level, started a west crosscut No. 1 and extended it 25 feet; formation, hard porphyry.

GOULD & CURRY.—Northwest drift extended 15 feet through old filling of fair quality of ore; total length, 175 feet. 400.—West crosscut No. 3 extended 25 feet; total, 85 feet; face in clay, porphyry and quartz showing some value.

Hot Creek District.

SILVER.—Belmont Courier, Dec. 27: Messrs. Merritt and Wager are extracting good silver ore from their mine in Hot Creek district which is shipped to Salt Lake City for reduction. The Anderson Brothers have discovered some rich silver ore in their mine in Hot Creek district. They will develop the new find shortly.

Spanish Belt District.

QUICKSILVER.—Belmont Courier, Dec. 27: William McCann is engaged in developing a quicksilver mine at Spanish Belt, Nye county. Some of the samples of ore are very heavy and carry cinnabar in good quantities.

Pioche District.

RAILROAD AND MINES.—Salt Lake Tribune, Dec. 30: Mr. W. S. Godbe, president of the Pioche Con. Mining and Reduction Co., returned yesterday morning from an extended business trip East. It was learned from him that owing to the temporary suspension of the railroad extension from Milford, matters in Pioche cannot be pushed with the same energy or on the same scale as they otherwise would have been in that somewhat remote but attractive district. Work, however, on the principal mines will continue and additional ore resources be shown up, so as to be ready for shipping in large quantities as soon as the road gets there. The company can smelt a portion of its ores at Pioche to advantage and make money, but a moderate profit does not seem to satisfy this mammoth concern when, with railroad communication and the facilities that will then follow, an income commensurate with the magnitude of the property may be secured. In answer to an inquiry as to the prospect for the early completion of the road to Pioche, Mr. Godbe said that the grading of the main line of railroad from Milford to Pioche has been completed at a cost scarcely less than and probably exceeding a million dollars. A few miles of track have also been laid from Milford, but owing to the urgent need of men and rolling-stock on the mountain division of the Union Pacific road a short time ago, this important work had been suspended. Its resumption, however, at an early day may be looked for with confidence, as it is hardly reasonable to believe that the great amount of traffic resulting from this extension will be neglected or lost sight of, especially after so large a sum has been expended toward the attainment of this object and when so little more is needed to secure it. In view, therefore, of the early completion of this road, the trustees of his company believe it is better to do the best possible with present facilities and make preparation for adequate expansion simultaneously with the advent of the locomotive.

ARIZONA.

HARQUA HALLA.—Phoenix Gazette, Dec. 30: From Harqua Halla we have received the following communication: Hubbard & Co. are building roads and grading for their large reduction works. The machinery to the amount of 500 tons is now being unloaded at Sentinel. Lehi and Rosmer have opened up three fine bodies of ore in their mines. C. H. Gray and George L. Davis have done the annual assessment work on two fine gold properties with gratifying results. Quinn & Co., besides opening up some fine properties of their own, are doing annual assessment work on three gold properties for Kinney and Flaherty of Phoenix. A San Francisco company has purchased the Socorro mine and is working a force of men on the same preparatory to erecting a 10-stamp mill. Harrington & Co. are doing annual assessment work on two properties that prospect well in gold. The Harqua Halla Consolidated G. M. Co. is taking out ore from its numerous properties to run through Harris mill for the gratification of an English company which is negotiating for the purchase of this property. A large body of rich ore has been uncovered in the Seelig mine, owned by Seelig & Co. of Phoenix. The Sadie Wentworth mine shows a large body of rich ore. This mine is owned by Fred Wentworth & Co. Both mines are on the same mineral belt as the great Bonanza mines, and only a short distance therefrom. We look for a lively camp here this winter.

AROUND PRESCOTT.—Courier, Jan. 2: Supt. Helm is about ready to commence hoisting ore out of the Tiger. W. M. Clappold, manager of the Prescott ore works, tells us that he is shipping one car of concentrates for J. I. Roberts, of Walker district; a lot of gold ore for Frank McCahe, of Big Bug; concentrates for the Crowned King, in all about five carloads. The last shipment of White Spar ore yielded about 250 ozs. silver to the ton. Chas. M. Clark, who yesterday returned from a two-months' trip to Chicago, Kansas City and Denver, while in the latter city bought machinery for the Silver Belt mine. We are indebted to W. A. Linn for the following concerning mines owned by Frank McCahe and others, in Big Bug district: The Gladstone, a large, strong vein, is opened by a tunnel commencing at the surface and extending along the vein a distance of 135 feet, gaining a depth of 70 feet at face of tunnel; also a shaft 40 feet below level of tunnel, showing the same quality and character of ore as is found above. The vein has a uniform width of fully five feet, containing but little or no waste at any place yet exposed, with upward of 200 tons of ore now on the dump, which, from careful and frequent samples and assays, should yield, at a low estimate, \$40,000. Wecker & Snapp, owners of several ledges in Hassayampa district, are sinking deeper in their Mountain Star, which they think is really better than their White Spar Mine. Quartz Mountain mine is in prime condition. There is in it a large chimney of very rich

gold ore. Frank McCabe of Big Bug district was at the Prescott ore works recently with ore from the Gladstone mine which sampled \$146 per ton in gold. Fred Little, John S. Jones and other miners are opening promising veins east and west of McCabe's mines. Talk is that work will soon be resumed in Groom Creek district. Lynx Creek hydraulic miners are sending a great deal of worked-out gravel down the stream. Farmers are already talking of having some of their land covered by slickens. Ed L. Johnson and Mr. Waterman claim to have a very rich gold ledge near Walnut Grove. A large copper ledge was recently found in the Mazatzal mountains, in this county, we think. The ore carries some gold. The Copper Queen Co. has just put up over \$70,000 for the Neptune group. Mr. Farish is shipping fine ore from the Phoenix mine.

HACKBERRY.—Mohave *Miner*, Jan. 3: Ikc Conkey was down from Hackberry this week and reports that the old Hackberry dump is doing well for Conkey & Young. Steve Henkle and Dan'l McGlone have a lease on the Tuckaho. The mine is looking well. C. H. Park, superintendent of the Queen Bee, was in Kingman Thursday. The connection has been made in the shaft and drift, and the mine has lots of good ore in sight. Mr. Park is not satisfied with the present depth of the shaft and will sink it 100 feet deeper. The assessment work was done 00 more claims this year than in any year in the history of mining here. In comparison with other years fewer locations were made on the first of the year. Miners are beginning to realize the value of doing assessment work on their claims. There is but very little ore in sight, and teamsters and sampling works are experiencing a dull season. Gilliland, Darden & Co., lessees on the Empire mine, made another strike of rich ore. The pay streak is two feet wide. Steve Smith's claim on Sursum's Peak is looking fine. The pay streak is widening out and carries considerable native silver.

BRITISH COLUMBIA.

A TWO-FOOT LEDGE ON ANDERSON CREEK.—Nelson *Miner*, Jan. 2: On the head of Anderson creek, about three miles due east from Nelson, J. P. Lamotte and his partners are working on a claim named the Cub. They have a two-foot ledge, the pay streak varying in width. A tunnel is being run in on the ledge, and it is now in 25 feet. Work will be continued all winter.

PEACOCK AND GRAY COPPER.—Jim Fox, one of the owners of the Dandy, reports the shaft on that property down about 40 feet, with three feet of ore, fine peacock and gray copper, in the bottom of the shaft. Little trouble is now had in handling the water, and Mr. Fox is more than sanguine that the Dandy will yet be one of the big mines of the Toad Mountain district.

TRAIL CREEK.—The incline shaft on the Lily May is down 30 feet, showing a three-foot ledge of cube galena. Five men are at work on the Le Roi, and the same number on Springer's claim. Perdue & Stewart are sinking a shaft on the Zlor, a claim that is believed to be second to none in the camp. About 40 men are wintering in the district.

RICH ORE.—While the Blue Bell is the only property on the east side of Kootenay lake developed into a mine, good ore is brought in for assay from several claims in that district. Bryan, the assayer at Ainsworth, reports that the richest ore he assays comes from over there—the ore being free milling and carrying ruby silver.

WILL WAIT UNTIL SPRING.—Owing to the difficulty of getting in machinery, the work of sinking a shaft on the Little Donald will not be commenced until spring. The owners of the Krao, another Hot Springs property, have also decided to await spring before starting up its machinery. It is reported that the latter mine will be stocked.

WORKING THREE SHIFTS.—At the Skyline, in the Hot Springs district, work was resumed on the two-compartment shaft now that the steam hoist and pump are in position. Three shifts are run, with Tom McGovern and Alec McLeod as foremen to charge and Dr. LaBau and Joe Petty as engineers. The shaft is down nearly 100 feet.

THE SILVER KING TUNNEL.—The tunnel on the Silver King was in 316 feet on Sunday last. A foot of rich-looking ore is now in sight on the floor of the tunnel. The rock continues hard.

COLORADO.

DREXEL TUNNEL.—Colorado *Mining Gazette*, Dec. 27: The Drexel tunnel has been commenced and will be pushed into Saxon mountain as rapidly as possible. The object is to intersect and develop the Pickwick group of mines. The length of the tunnel will be about 1300 feet. The Pickwick vein will be tapped at a point about 1100 feet perpendicular. This tunnel will pass through a number of other well-known mines and will be a good avenue through which to work them. A vein of stamp-mill dirt has been opened up in the heading of the lower tunnel on the Ohio Gulch M. Co.'s property, 30 inches in thickness. In the heading of the upper tunnel on Ohio mountain, a vein of solid galena, as yet but one inch in thickness and carrying yellow copper, has been exposed. As explorations progress, this property improves. The Centennial has a vein of ore 4 feet thick, 18 inches of which is good smelting ore and the remainder concentrating material in the 500-foot level. About 70 tons of smelting ore was shipped from this property last month. Fifteen tons of concentrating material is produced by the Senator mine daily. A wagon-road is now being built from Dumont to the workings. When finished it is the intention of the parties to put up a concentrating mill at the place above named. The shaft on the Baltimore mine is now down about 480 feet and is still being sunk. Upon the north wall side a vein of ore about 3 inches in thickness has been opened up of an apparent high grade. The indications are that the ore vein will continue to open as depth is gained until it is of such a size that the record of this property will stand among the leading producers of Clear Creek county.

THE ST. JOE.—*Aspen Times*, Jan. 3: The first of the year has witnessed the resumption of work on the St. Joe and Mineral Farm. Yesterday a large force of men was set to work in the mine by Manager Mike Murphy. For some time he has been getting ready to start up, but a great deal of preliminary work was necessary. It has been some time since the property was worked and it had gotten out of repair, and the incline had filled up with

water for about 20 feet. It was only yesterday that men were set to work in the bottom. The new company that has taken hold of this property has made calculations to develop it on a gigantic scale. They will sink the incline down and prove up the ore bodies that are exposed in the upper levels. Their lease requires them to do at least 400 shifts a month and this will necessitate the steady employment of 18 men. Developments in this property will be eagerly watched by all mining men, for on it will depend the value of a large area.

THE EDISON NO. 2.—The developments in the lease on the middle section of the Edison, known as the Edison No. 2, have been going forward steadily since the ore body was struck there, and the showing made is most satisfactory. The lease has been paying expenses for some time, but no effort has been made to take out anything in excess of the needs of the pay roll. It is expected, however, that a large production will be made during January and succeeding months. One of the lessees informs the *Times* that the development work done since the discovery of the ore body has blocked out mineral to the estimated value of \$70,000.

IDAHO.

THE STRIKE IN THE VENUS.—Wood River *Times*, Jan. 3: The ore-vein cut in the lower workings of the Venus mine, a couple of weeks ago, still holds out, and now shows a width of three feet, carrying rich streaks of sulphurets of silver, iron and gray copper. As the Venus is famous for the high grade of its ore, there can be no doubt but that what is already in sight will yield a large amount of money when extracted and sold.

THE RED CLOUD.—The third monthly dividend of the Red Cloud Mining Co. was declared at Pittsburgh, Pa., where the principal office of the company is located, the 15th inst. It was of \$10,000. This makes the third consecutive monthly dividend of \$10,000 declared and paid by this company, and, if rumor is correct, its ore bodies promise to pay several more.

THE DALY'S MONTHLY DIVIDEND.—The Daly Mining Co. has declared its regular monthly dividend for November. It is of the usual amount—\$37,500—making a total of \$450,000 per annum. No business pays as large profits as a properly conducted mine.

SILVER MINES OF MURRAY.—Murray *Sun*, Jan. 3: On Saturday a *Sun* reporter, in company with a gentleman friend, took a trip to some of the claims on Upper Prichard creek. Proceeding up the north-west branch about one-third of a mile, the discovery tunnel of the Paragon was reached. The face is in about 34 feet from the place where ground was first broken, and is at least 25 feet underground. There is at least two feet of solid galena—shipping ore—and all of four feet of concentrating ore besides. The ledge is over six feet wide. The concentrating ore is a dolomite formation, with stringers of galena and silver thickly running through it. Both foot and hanging walls are of slate. Under the hanging is a soft gouge of rich ore and on the footwall another gouge is found, making the ledge a very easy one to work. A slip or seam divides the shipping from the concentrating ore, so that there will not be the least difficulty in assorting the two grades. This ledge cuts the formation squarely across, and from every evidence is a true fissure vein. On the dump there are about 25 tons of shipping and about two tons of concentrating ore. Another tunnel has been started 25 feet above the creek, and the owners calculate that by running in 150 feet they will tap the ledge at a depth of 130 feet. There are several extensions of this ledge owned by different parties. Messrs. Stevens Bros. and Sims own the Huntche on the east, and Kincannon and Warren own the one still farther east, the St. John. On the west, Messrs. Cook, Tibbals, Sheehy and Tilden have located the Joe Cook claim, while Warren and Kincannon have put their stakes on the Old Pipe ledge. These are all on the same ledge as the Paragon. The latter was located some six weeks since by Chas. W. Tilden, and his partners are County Auditor Tibbals and his deputy John P. Sheehy. The next claim was the Barton, now being worked under bond of Col. J. M. Haskell, a mining man of many years experience on the Pacific Coast States and Territories. Under the guidance of Col. Haskell the party climbed the hill to the Barton tunnel. Its mouth is about 90 feet from the bed of the creek. The face is 140 feet. Mr. Haskell calculates that he will have to run 575 feet in order to tap the ledge at a depth of 362 feet below the discovery. The formation through which he is running is quartzite.

MONTANA.

BOULDER NOTES.—*Age*, Dec. 31: The Boulder sampling works sent a car of ore to East Helena the past week and is loading another car for the same place. J. J. Holmes is putting in the winter developing a quartz lode in Peters gulch below Comet. He has a tunnel in 40 feet and expects soon to strike the lead. The Bigfoot M. Co. is to be reorganized early next month and considerable development work is likely to be done on the Bigfoot mine early in the spring. All work on the Ida mine in the Willow Springs district has been suspended for the winter except some contract work which is being done by Peter Mack, the foreman. The shaft is down to water level, 200 feet. In the spring Messrs. Harris & Beattie will put on pumps and steam machinery and sink 100 feet and then crosscut to the lead. There are two veins on the surface of the property something over 100 feet apart. At the present depth of the shaft they have approached within 15 or 20 feet of each other, and it is thought that the crosscut from the 300-foot level will strike the vein at least 50 feet below the junction of the two. After striking the vein with the crosscut, drifting will be done and this will decide whether the owners have a mine or only a prospect. It is to be hoped that the former will prove to be the case. Such a result would cause an immense development of mining properties in that district.

SWEET GRASS HILLS.—Montana *Mining Review*, Jan. 3: Reports from the Sweet Grass Hills indicate that considerable development and representation work is still going on in that section. The Jumbo, a copper property, located on East Butte, near Corral Creek, is said to be making the best showing yet made in the Hills, and it is the intention of the owners to continue development work on this property all winter. The Great Northern con-

struction trains are now less than 20 miles to the south of these claims, but track-laying is said to be progressing slowly on account of the scarcity of labor.

THE EMMA NEVADA.—*Inter-Mountain*, Dec. 31: A mining deal has been consummated in the past few days which places the control of the Emma Nevada mine in the hands of John Helehan and a party of gentlemen in this city. A carload of ore from this mine was recently treated at the Parrot smelter and yielded 79.4 ounces in silver and .94 in gold to the ton. The ore is of a fine milling character, and contains sufficient gold to pay all expenses if the company had the means at hand to treat the ore. The work this winter will be confined to development, as the company intends to fully ascertain the extent and quality of the ore bodies before erecting works. Preparations for sinking the shaft to the 200-foot level are almost complete, and work will soon be commenced. Further than the shipment of an occasional carload of ore to pay operating expenses, the company will not extract any ore. Last week George Long and A. Wilmott visited the mine and were quite favorably impressed with it. They reported the lead seven feet wide at the 50-foot level, and took away some very rich specimens of horn silver ore. A tunnel is being driven on the south lead and above the level of the shaft, and is now 200 feet. The pay streak is about eight inches wide and a sample taken from the ore by the gentlemen named, assayed 1549 ounces of silver and \$6 in gold to the ton. The shipments of ore made during the past few months to this city show it to be of a high grade, running from \$100 to \$200 per ton. After the lead is tapped on the 200-foot level a bright future is predicted for the property.

EAST GRANITE.—Every day develops new and important facts relative to this new and enterprising company. They have every reason to feel jubilant over the results of the past week's work. In a stope on the crosscut at 50 feet down the shaft, a vein of about 18 inches of ore that will assay high in silver is exposed, while in the bottom of the shaft numerous stringers are being passed through, indicating the presence of a big lead on the property.

NEW MEXICO.

PIÑOS ALTOS.—Silver City *Enterprise*, Jan. 3: The Pacific mine No. 1 is shipping 30 tons of ore per day to the mill located above the city. The ore is milling well and the mine is in excellent condition for working. Eight teams with trail wagon are employed in transporting the ore from the mine to the mill. The Arizona mine, lying immediately east of Pacific No. 2, is among the oldest locations in the Pinos Altos gold region, the location covering three veins, all gold bearing, and with proper developments can be made paying propositions. A tunnel has been driven on the vein a distance of nearly 300 feet, and it is believed that 30 or 40 feet farther the tunnel will reach a point where the east and west veins will unite on their dip. The proprietor, Mr. John McDonald, has for the past 20 years been working the property with a moderate degree of success, and the developments now in progress will open up the mine in excellent shape. The skill employed in the opening of the Alpha and Omega mine, belonging to Huston & Thomas, west of Pinos Altos, is meeting with unprecedented success. The Messrs. Carrera & Doheny since the inception of their management have uncovered lead riches which hitherto have had an existence possibly only in the imagination of the owners. The daily tonnage keeps a dozen or more ox teams employed.

OREGON.

SPARTA.—Cor. Brodbeck *Democrat*, Dec. 31: The melting snows are furnishing free water sufficient for "Rocker diggings," and quite a good many miners are taking advantage of it. Work on the principal mines here continues with renewed activity since the recent rich strikes in Del Monte, Oro Dell, Gray Eagle and Little Archie, and as we have always predicted, Sparta will take the lead in 1891 as the largest bullion-producer in Eastern Oregon. It is our intention in this article to show that we mean business in this camp, as the record of work done will prove. The figures given are absolutely correct: Gray Eagle and Union mines, owned by Clough & Read, have pushed their main tunnel 700 feet; two incline shafts sunk from tunnel level, 200 feet; Arkansas Belle has done tunnel work, 430 feet; Marrotte mine (Little Archie) tunnel 100 feet, and winze No. 1, 42 feet; winze No. 2, 90 feet; Napoleone (Marrotte group) tunnel, 192 feet; Windsor (Marrotte group) shaft 20 feet; Del Monte shaft will by Dec. 27th be 200 feet; Gold Ridge, incline shaft, from 150-foot level in 5 feet of ore, 50 feet; Hidden Treasure shaft, 32 feet; Gold Hill tunnel on ledge, 75 feet; Silver Queen tunnel on ledge, 72 feet; Free Thinker shaft, 20 feet; Tom Paine shaft, 30 feet; Mogue Chief, owned by Sparks of Baker City, tunnel, 60 feet; Atlantic and Pacific shaft, 60 feet; Golden Gate, below 100-foot level, 40 feet; Wiese, Buckland and Mix, tunnel, 400 feet; Wild Irishman tunnel, 400 feet; Blue Gulch, C. C. Read, tunnel, 100 feet; Blue Gulch, Detroit Co., shaft, 60 feet; Ainsworth group, E. E. Clough, tunnel, 65 feet; Ollie Woodman, shaft, 62 feet; Bill Arble mines, shaft and tunnels, 118 feet; Oro Dell, winze from tunnel level, 60 feet; Belle of Kansas (Oro Dell group) shaft, 21 feet, total, 3899. I am satisfied that at least 250 feet of shaft and tunnel work have been done on prospects that I have overlooked; yet the above is not a bad showing for "Poor old Sparta."

UTAH.

GOLD.—Salt Lake *Exchange Journal*, Dec. 31: Mr. T. A. Snell, manager of the Stewart No. 2 mine in Carr Fork Gulch, Bingham, is in the city this morning with a bar of gold bullion that is 900 fine and worth all the way from \$500 to \$600. He now has \$150,000 worth of gold ore blocked out ready to break down and ship, and believes that the mine contains an inexhaustible supply of ore running from an ounce and a half to five ounces in gold and ten ounces in silver. Mr. Snell has only had charge of this property six months, but he is doing wonders with it. Bingham is a great camp and is coming to the front with rapid strides.

Review,—Salt Lake *Tribune*, Jan. 2: The

closing of the week is coincident with the close of the month and the year. The twelvemonth has exhibited great prosperity in this mining region, as is shown in the Wells, Fargo & Co. annual report. The week just closed has shown fair production and the receipts in this city have been good. The receipts of the minerals in this city for the week ending the 31st, inclusive, were valued at \$155,083 in total, of which \$43,941 was in ore and \$111,142 was in bullion. For the previous week the receipts were to the amount of \$186,240 in the aggregate, of which \$114,910 was in bullion and \$71,330 was in ore. The product of the Ontario for the week was in ore sales, \$15,655.66; and slugs, \$1579.12; a total of \$17,234.78. The Horn Silver report shows well for the year. Its stock was not sold or quoted in New York last week, a rare omission. Fine bar receipts in this city for the week were to the amount of \$18,858; bullion, \$28,677; copper matte, \$13,000; gold bullion, \$4,000; silver bars, \$24,295; selected lead, \$3978. Ore receipts during the week in this city were to the value of \$16,606 by Wells, Fargo & Co.; \$19,350 by McCormick & Co.; \$7985 by T. R. Jones & Co.

ORE AND BULLION.—Salt Lake *Tribune*, Dec. 30: Wells, Fargo & Co. yesterday received bullion, \$7375, ore, \$6976; total, \$14,351. McCormick & Co. received yesterday Hanauer bullion, \$4750; silver and lead ore, \$5400; total, \$10,150. A two-car lot of high-grade ore from Star district, the result of James Lavelle's efforts in opening up the old Buckhorn, has just reached this city.

STAR DISTRICT.—Mr. W. S. Martin, who has just returned from Star district, reports many improvements in the mining industry of that section. Mr. M. has just completed the clearing of debris from an old location that has stood for 18 years untouched, and reports the finding of a good vein of 40-ounce milling ore. Mr. Martin is too experienced a miner and too well acquainted with some of the "dog taxes" at present connected with the handling of smelting ore to become excited over his find. He said his being a silicious camp, the call for iron, lime and lead makes the smelting charge on quartz ores, such as his, reach the neighborhood of \$26 per ton.

RICH AT DELANO.—J. J. Starbuck has struck it rich in a mining claim at Delano, out on the Central Pacific railway. He has on his I. Jay S. claim 18 inches of vein on which at a depth of 18 inches below the surface the top of the vein was broken off and assays an average of 200 ounces silver. The sample brought in is certainly a fine piece of ore. Yesterday he sent a man to begin work on it, and will employ more men as soon as needed.

WASHINGTON.

ONE THOUSAND TONS.—Colville *Miner*, Jan. 2: E. E. McArthur, a well-known contractor and teamster of Deep Creek Falls, is in the city with his teams and is making preparations to immediately begin work upon a contract to deliver 500 tons of Daisy ore on board the cars of the Spokane & Northern railway. Mr. McArthur is not pleased with the long route, along the Columbia and Colville rivers, over which he will have to haul his ore, a distance of fully 40 miles, while the distance straight through is scarcely 20 miles. His opinion is that a wagon-road can be constructed through the country from the Daisy mine to Colville, over an easy grade, at a cost not to exceed \$1000; and he says that if the Daisy Co. will double his contract, making it 1000 tons, he will build the road at once. The distance will be enough shorter to save far more time than it will require to make the cut-off. The building of this road will prove of incalculable benefit to Colville. It will open the way to the entire Summit mining district, rich in the most valuable deposits of mineral.

Please Remit.

The beginning of a new year is a good time to settle up the debts of the old ones. We are obliged to remind those who owe the PRESS on subscription account, that it will be a great convenience to us if they will soon remit what is due. Those who can also pay in advance will also do us timely and well-appreciated favor. We are doing our best to present a very valuable paper, representing carefully, earnestly and conscientiously the welfare of its intelligent readers and the best interests of the arts, sciences and mining and mechanical industries of the Pacific States.

To do this we deprive ourselves of some of the most lucrative lines of patronage available to the average newspaper.

By paying as promptly as possible, friends, you will greatly encourage us in our sincere efforts to favor you and the best interests of your calling.

POWDER.—It is reported that the pool among the local powder companies is at an end, owing to the withdrawal of the California Powder Works. On Wednesday, this company, through John Bermingham, President, and John F. Lohse, Secretary, gave notice that it would withdraw. As a result, the companies will do henceforth independently in the future, and, although prices of powder are low, they are now apt to go still lower, owing to prospective competition. The Giant, Safety Nitro, California, Vigor and Vulcan companies were in the pool, and some of the concerns have been closed down under duress. These will start again now in all probability. It has been expected that this break-up would happen, as the California Company was not fully satisfied with the arrangement which has existed.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this coast now for so many years, the firm's name is a well-known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their Scientific Patent Agency (S. F.) firm week to week and year to year.

MECHANICAL PROGRESS

A New Metallurgical Process.

Aluminum for Ten Cents a Pound.

The new Kentucky process, by which it is said aluminum can be produced for ten cents a pound, is described as follows by the Savannah Morning News:

Kentucky has a new company, just organized at Newport with \$250,000 capital, to manufacture aluminum by a new patented process at a nominal cost. It involves the use of calcium fluoride for a flux and a little calcium carbonate in a jacketed furnace. It requires about 36 hours to make the first slab. By another process, in which copper ore and old scrap, mixed with alumina clay and fluoride of calcium for a flux and a carbonate of lime and oaks are melted together, as in the first process, aluminum can be produced at 12 cents per pound. Condensed vapor comes out in the shape of slabs called aluminum bronze. This bronze is re-heated in an oven to a cherry heat without flame and plunged into a cold bath of strong salt water and glycerine, and this rapid process of heating and cooling is repeated 10 or 15 times. The re-heating causes the aluminum to melt the copper, and it comes out like heads of sweat. After the slabs are cooled in the bath, the aluminum drops are chilled and cannot get back into the copper, which is struck with a hammer, causing the aluminum to drop. Next the drops are gathered and melted into ingots.

A New Substitute for Steel.

This company will also manufacture a new metal known as *schmid barrenquiss*, meaning "a good welding metal." It is an aluminum alloy composite. It cuts as easily as tin, yet by tempering can be made to cut glass. It makes fine horseshoes. It has a tensile strength of 200,706 pounds to the square inch, and will stand an elongation of 52 per cent. This metal will do away with malleable iron and steel castings. It is made of refuse and can be produced for nine cents per pound. Should this process prove a success, it is certainly one of the most important discoveries of recent years.

A New Electric Welding Machine.

The process of welding by electricity has now become fully removed from the domain of speculation and mystery, and may be introduced into even the very small workshops of all our cities and towns. Thus through the aid of scientific investigation, the flying sparks of the village blacksmith shop may readily be replaced by the effective action of one of the most powerful and subtle agents of nature, brought under the most quiet control of even a blacksmith's boy helper.

The weld is made without smoke or noise, and with but a trifling amount of manual labor. Instead of the old method of heating two irons in a forge and hammering them together with many and heavy blows, the new method simply fuses them together with a little pressure.

Heretofore the appliance for such work has been quite cumbersome and expensive; but quite recently the Electric-Welding Co. of Boston, Mass., has devised a new, more simple and inexpensive machine, which it has been perfecting for several months, and one which is within the reach and means of all. It is adapted to miscellaneous work, and is expected to prove of special advantage to metal-workers who have a large variety of work, and whose annual product will not warrant their purchasing the larger welding plants which the Welding Co. has been furnishing. The new plants are being built of three distinct types, in all covering a range of from five square inches to one-eighth square inch section. They are furnished with a variety of interchangeable clamps. The welders can be run by any competent employe, and the simplicity of their construction and adaptability to a great variety of welding is expected to lead to much wider use of electric welding by machinists and others who do more or less welding; and desire such a machine constantly at hand ready for use. The company installs the plants, adapting the clamps to such work as may be presented, and instructs those who may be placed permanently in charge of the machines, after which there is said to be little likelihood of trouble from inexperience. The welders do not require special attention, and render unnecessary the use of the forge for any kind of ordinary shop welding.

INCREASING USES OF ALUMINUM.—Mr. Cowles of the Lockport Company, in referring to the increasing uses for aluminum recently, said: At 50 cents per pound, aluminum will compete with copper at 17 cents, for measured by volume the first is 3.56 times that of the other. The electrical conductivity of aluminum 98 fine is 75 per cent that of copper. It would therefore take about one-third more area to do the same work, but it is then much lighter. For motors for electric cars, a reduction of 45 per cent in weight can be secured by using the new metal. The coating and lasting qualities of aluminum far surpass those of tin, and aluminum would cover three times as much surface, pound for pound. Tin would have to sell for 16 cents per pound to compete. Nickel, at 70 cents per pound, would no longer be used for plated ware or coinage, as aluminum is much better and cleaner in both cases.

Mr. Cowles says that the price of aluminum will naturally fall lower and lower as the plants for making it increase and the market adapts itself to the absorption of larger quantities of the new metal. He expects to see it sell for from \$200 to \$300 per ton, and at these figures it will be the cheapest metal in use next to iron and steel.

THE LARGEST STATIONARY ENGINE in the world is at the Fredensville zinc mines, six miles south of Allentown, Pa. During the past few months it has pumped dry, by underground drainage, nearly every ore pit, spring and small stream within a radius of five miles. The engine is known as the "President," is of 5000 horse-power and is run by 16 boilers. At each revolution of its ponderous wheels a small stream is thrown out, the number of gallons raised every minute being 17,500. The driving wheels are 35 feet in diameter and weigh 40 tons each. The sweep-rod is 40 feet long. The cylinder is 110 inches in diameter, while the piston-rod is 18 inches in diameter and makes a 10 foot stroke. The engine has a ballast-box capable of holding 60 tons, and to feed the boilers, 28 tons of coal are required daily. On the engine is the largest nut in the world. It is hexagonal in shape and weighs 1600 pounds. To tighten or loosen this nut, 20 men are required, while the wrench that fits it is 20 feet long. From the end of the walking-beam of the engine to the bottom of the shaft, the distance is 300 feet. The masonry on which the engine rests is 108 feet deep, some of the foundation stones weighing five tons. The engine operates four pumps, three of which are 30 inches in diameter and the fourth 22 inches. *Iron Trade Review.*

THE EXPORT AND THE CARRYING TRADES.—Unquestionably our export trade in machinery, implements, vehicles and hardware is increasing, but it is equally true that it is very much less than it would have been had our Government encouraged such trade as do the Governments of the manufacturing countries of Europe. The last official reports of exports and imports "show that during the fiscal year ending June 30, 1890, our foreign trade reached the highest figures in the history of the country, the enormous sum of \$1,649,192,014." Everything else has reached the highest figures also, and of the exports, a very large proportion was produced from the soil.

THE AMERICAN WOOD CARVING MACHINE, which is in reality an embossing machine—pressing any desired figure or form of wood engraving into a plain wood surface—has passed its experimental stage and is now in use with large and practical results. This machine produces perfect imitations of hand carvings in all designs, on any length, width and thickness of stock. It is simple in construction, occupies only 2x4 feet floor space, and is noiseless, automatic in action and free from dust or dirt. It cannot get out of order. It will perfectly finish from 1000 to 2000 lineal feet in ten hours, and from 1000 to 2000 pieces of paneling per day.

DRY LUBRICANTS.—The use of dry lubricants for bearings in places where oils and grease are objectionable, or where contact with fire may occur, is becoming better understood, and graphite in one form or another is now in general use. It has been employed on various kinds of machinery with uniform success. Mica also, in a dry, pulverized state, has given satisfactory results in many cases. Self-lubricating bearings, consisting of metal shells filled with compounds of graphite or mica, have also been operated with complete satisfaction.

EXPERIMENTS lately made on the strength of bent pipes have shown the strain on the inside of the angles, due to efforts of the pipes to straighten themselves under pressure. In one experiment where a copper pipe of 6 1/2 inch bore and three-sixteenths of an inch thick was employed, the angle was 90 degrees, and the legs 16 inches long from the center. At a pressure of 912 pounds to an inch, the deflection of the pipe was nearly three-eighths of an inch, showing an enormous strain on the inner side in addition to the pressure.

THE LARGEST PRODUCER of steel rails in the world is the Illinois Steel Company, which was formed about a year ago by the consolidation of four steel-rail mills. By reason of their ownership of ore mines and transportation lines on the lakes, and their nearness to the Western market, this company has been able to occupy a prominent position in the rail trade.

FORGED CAR-WHEELS are to be made by a new process by a Pittsburgh firm, according to press accounts. The wheels are to be forged from ingots of open-hearth steel. A series of dies under steam hammers will gradually develop the perfect wheel. The first experiments are reported as satisfactory and a plant for manufacture is promised at an early date.

MINING BY MACHINERY.—The old-fashioned way of mining coal with the pick and shovel is rapidly becoming a thing of the past. The mining machine is constantly making headway, and it will not be very long until it will have entirely superseded the old method.

ABOUT 1300 men find employment in the different mines and mills in Park City (Utah), and the average daily pay to each is \$3.25.

SCIENTIFIC PROGRESS.

A Substitute for the Potato.

Albert Meyer, a chemist, while in conversation, recently, with the editor of the St. Paul Globe, spoke quite enthusiastically of a new tuberiferous plant which he thought would do exceedingly well if introduced in the Northwestern States. He said:

A few years ago a scientist discovered in Japan a plant resembling the potato, and sent samples of it to Berlin and Paris to be experimented on. These experiments have been decided successes, and the new potato has been extensively introduced in Berlin and Paris, especially in hotels and restaurants. A number of farmers in our vicinity, with whom I conversed on the subject, are willing to experiment on the plant next season. The Royal Prussian Society of Berlin has taken pains to make experiments with the plant. The scientific name of this plant is *Stachys tuberifera*, but as to their form they might be called pine cones. *Stachys affinis* is another name, and lately they have given it the name *Stachys Sieboldii*. The cultivation is the same as the potato, and there have been found over 100 knolls in one hill; some as many as 300, but this is probably exaggerated. They are, of course, not as large as our common potato. According to the *Garden Flora*, the organ of the society, the analysis of the fruit is:

Water.....	78.33
Protein.....	1.50
Amide.....	1.67
Fat.....	0.18
Carb. hydrate (Principal galactan).....	16.57
Cellulose.....	0.73
Ashes.....	1.03

There is neither starch nor sugar, but galactan, a substance between both. *Stachys affinis* or tuberifera is an agreeable tasting vegetable when boiled in salt water and served with butter and parsley sauce. Some people like them sautéed in oil, but that is merely a matter of taste. Prepared like *pommes de terre frites* (potatoes cut in small slices and fried in butter), they are claimed to be a delicious dish. The taste is at first like that of a sweet potato, but one will soon feel a very fine piquant taste. They do not need to be peeled, but are only washed clean in water, which is another blessing to the housekeeper. They are kept in the ground as late as possible, and preserved packed in sand in the cellar during the winter months.

Exposed to the air, they will shrink and lose their nice, white mother-of-pearl-like color. The plant is winter-hardy, and thrives in any soil. Frost does not hurt them, and to have them always fresh, they are left in the ground and dug as wanted. In our climate it is best to keep them in a ditch or in sand in the cellar. W. Perring, Inspector of the Royal Botanical Garden in Berlin, informs me that the production is very large, and that there are many enthusiasts in favor of the new plant in that city, which prophesies for the plant a great future. The expectations of high prices and large yields will induce a good many farmers to make a trial with the new plant. I have already quite a number of orders for seed.

Personal Equations.

A Machine that Corrects Errors that Humanity Can't Help But Make.

The St. Paul Pioneer Press states that Carleton College Observatory has just secured a curious instrument invented by a scientist at Washington and called a "personal equation machine."

The object of the instrument is to harmonize the observations of different persons who are working together, at different times or at the same time. Astronomers well know that no two persons see exactly alike, by which is meant, for example, no two persons will say that a star passes a wire in a telescope at exactly the same instant. One will record its apparent passage slow on true time, while another will almost uniformly put its time fast. Observers unconsciously form a habit of seeing objects fast or slow on true time, and the better the observers are the more steady this error is as compared with true time. This error the astronomer calls the personal equation of the observer. In amount the personal equation varies from 0.02 of a second of time to something more than half a second for different observers, either fast or slow on true time. Such errors as these cannot be tolerated at all in astronomical observations for fundamental or original work of a nice kind, but must be in some way eliminated before final reduction can be attempted.

To accomplish this, in one way, an ingenious machine has been constructed which sets in motion an artificial star, quite like the appearance of a real star in the telescope. As this artificial star passes wires in the machine, the observer records his observations, and the instrument automatically records the exact time of the real passage of the star over the same wires. Now both records are made by the electric current, and consequently are perfectly true. These records are taken automatically in ink or by an instrument called a chronometer, and hence their differences can be measured with the utmost accuracy, and in this way the errors of the observer on true time are satisfactorily known.

The machine is in use every night that observers work either together or singly, so that

changes in individual personal equations may be detected, as well as the differences that may exist between observers. The instrument, therefore, furnishes an unvarying standard for accurate observation.

AN INTERESTING DISCOVERY.—Many things have been discovered which tend to show the existence at some period of the world's history of a race of men possessed of a knowledge and executive ability equal to that claimed by the most advanced of our nineteenth-century civilization. One of the latest of these is that made in an Illinois township recently, which goes to show that the aborigines, or a race of men that inhabited this continent before its discovery by Columbus, were well up in the industrial arts and acquainted with the natural resources of the country. The report says that the discovery was made in Jackson county of an old smelting furnace, supposed to have been used by some race of people that once inhabited this country long before its discovery by the white man. It is located in the west part of the county, and was discovered by a mere accident. Several of these old furnaces have been discovered in the vicinity, and they are a great curiosity. This particular one is built in a ravine, and it inclines upward as its mouth leaves the almost abrupt sides of the ravine, and continues in this direction for some 20 feet, then declines until it empties into the opposite side of the ridge, with a charger built of antique marble. Further search has brought to light other evidences of this industrious people, such as pieces of iron and lead ore, sink-holes, slag-piles, etc.; in fact there is every evidence that at this place there once existed a prosperous and thrifty mining camp. Great interest is manifested in the discoveries, and other developments are expected which will reveal new and valuable information.

THE PATH OF STORMS.—A method is now on trial at the meteorological office at Stockholm which seems likely to throw some light on a subject which hitherto has been attended with much uncertainty, namely, the determination of the path taken by storms. From the telegraphic weather reports, tables of the density of the atmosphere have been constructed, and other data have been collected which have been embodied in special charts. These charts are found to give a more reliable clew to the movements and origin of cyclones than the usual method of the comparison of the isobars and isotherms alone. The latest investigations show that storms move in the direction of the warmest and dampest air, parallel to the lines of equal density, leaving the rarer air to the right hand. M. Faye, member of the French Academy of Science, thinks that it is feasible to predict storms twelve hours in advance of their coming by the sounds which the changing atmospheric conditions produce and which the telephone will transmit.

TANNING BY ELECTRICITY.—M. Munz, professor at the Institute Agronomique, has published a favorable report on the Worms and Bile process of tanning by electricity. All the hides so tanned had, says M. Munz, the appearance of hides tanned by the ordinary process. Tests with acetic acid showed that the hides were thoroughly well tanned after a maximum of four days in the vats. Further chemical tests showed that the tannin was as well combined with the leather as in the ordinary method. We may mention in this connection that a large firm of tanners in Paris is sending out with every consignment of hides a certain proportion of electrically tanned ones, intimating that any of the electrically-tanned skins which are not found up to the mark will be immediately exchanged for some tanned by the ordinary process. No electrically-tanned skins have as yet been returned.

A CIRCULAR RAINBOW.—A correspondent of the London Times says that on Sept. 30th he and his party saw a rainbow which formed a complete circle, visible for nearly half an hour during their ascent of the Finsteraarhorn. "There were," he says, "heavy clouds lying some 4000 feet below, on the Aar glaciers, and it was on these that the beautiful, brilliantly colored ring lay. A secondary circle was also visible. We were near the summit of the peak when we first observed it, and from that point the face of the mountain on the Grimsel alpe is almost perpendicular."

NATURAL COKE.—The Seattle (Washington) Press in its notes from Alaska says that a remarkable discovery has recently been made near Unalakleet—a coal transformed into coke solely by the forces of nature. The locality has been taken up by the steamship company. So positively assured is the company of the extent of the deposit that it has undertaken to supply the local demand, in addition to furnishing during future seasons fuel, not only for its own steamers, but also for those in the Government service.

MADAGASCAR MINES.—A complete plant of hydraulic mining machinery is being made by Raoul Charley of the City Iron Works, this city, for shipment to Madagascar. A gentleman from that distant country came here and visited Nevada and Placer counties to investigate the methods of placer, drift and quartz mining. The plant ordered here will be shipped shortly to Mevatan, Madagascar, and competent men to operate it will go from here at the same time.

USEFUL INFORMATION.

PITTING AND WRINKLING OF VARNISH.—Varnish is very liable to pit if sugar of lead has been used as a drier; also when it has not been given time to ripen, which should not be less than four months. A painter, finding his varnish will not flow freely, is sometimes tempted to mix with it some other kind of varnish, in which case, looking at the sensitiveness of varnish to exterior influences, it is not surprising that pitting should ensue. Varnish at the bottom of a barrel very frequently contains sediment, and if this lower portion is used when the varnish has stood long, one must not be surprised at pitting. A damp floor in summer weather will at times occasion pitting, owing to the exhalation of the moisture; also a sudden chill. Wrinkling is almost an infallible result when varnish retains its humidity too long. If applied too thickly, certain portions of the surface are apt to overflow, hence wrinkling. Toughness is a good quality in itself, but accompanied by slow drying, wrinkling is apt to present itself; therefore it must be seen that the varnish has the requisite staying qualities.—*Painters' Magazine.*

AN IMPORTANT MARINE INVENTION.—A new sounding apparatus has been invented in England for which several advantages are claimed. The machine is intended to serve not only as a reliable means of sounding, but also as a submarine sentry, giving warning when any particular depth of water is reached. The apparatus comprises a winch with indicators, etc., and a wooden skinker, the latter being the essence of the invention. Practically, this skinker is a wooden kite reversed, and is so adjusted in weight and shape that it sinks when towed through water, and always remains at any given depth without any regard to the change of speed of the ship. The depth being arranged at that which will be perfectly safe, whenever bottom is reached at that depth the machine may be so arranged as to automatically sound a steam whistle or bell or give notice to the pilot in some other way that the ship is approaching dangerous water. The invention, it is said, has been subjected to prolonged tests and proven to be perfectly practical and reliable.

RAILWAY BRAKE SHOES of compressed leather is the novel proposal of a company in New South Wales. Waste leather scraps are steeped in a solution and subjected to hydraulic pressure to mold them into any desired shape. A report of Mr. D. H. Neale, Government Engineer of Railways, describes comparative tests of leather brake shoes with iron. The leather shoes weigh $4\frac{1}{2}$ lbs. against $21\frac{1}{2}$ lbs. for iron, and wear three times as long. The coefficient of friction is said to be considerably greater, so that 40 lbs. air pressure is as effective as 70 lbs. with iron brake shoes. If a practical brake shoe of leather or fiber were put on the market, its use ought to be made obligatory on elevated railways at least to stop the dangerous shower of iron particles, which injures so many eyes. Compressed paper has been talked of for this purpose, but has not succeeded in establishing itself in general use.

A DEVICE to catch those who are compelled to jump from windows at fires has been invented by Alfred Horley of Albany, N. Y. It consists of a large cushion provided with springs of long-range action, which save the unfortunate from injury by the rebound. This is mounted on a convenient running gear. The cushion can descend nearly three feet, and to prevent injuries from the rebound, air-cushions are applied as in door checks, which bring it gradually to a state of rest. This seems a most decided improvement over the old-fashioned net.

HOW GLASS CLOTH IS MADE.—The thread is drawn out of a molten bar of glass, by means of a rapidly revolving wheel, at the rate of 200 yards a minute; the weaving is done by looms as with silk. The coloring is applied with minerals, while the glass is in a state of fusion, before spinning, and the most beautiful shades are easily produced. The chief difficulty in the manufacture of glass cloth seems to be in the manipulation of the threads, which are so fine that a bunch containing 250 is not so thick as an average knitting-needle.

CHINESE TALLOW OR TALC, so abundant in Leadville mines, is said to be self-lubricating, and possesses many other advantages adapting it to that purpose. A prominent railroad man offers \$20 a ton for all the talc that can be produced. Should the experiments already made be corroborated by extended tests, an important addition to the mining resources of Colorado is assured, as talc is abundant not only in Leadville but throughout the State.

THE BESSEMER INVENTION.—The best idea of the value of the Bessemer invention may be formed from the simple fact when Bessemer began experimenting, steel sold in England at from \$250 to \$300 a gross ton. He soon made a better steel at a cost of \$30 a ton.

COOKING UTENSILS of all kinds are now made of wrought steel. These utensils thus made are of excellent quality, fine steel and good finish, and are practically unbreakable—that is, when used with reasonable care. They do not absorb

grease or retain the flavor of food previously cooked, and may be constantly kept at a fine polish.

ELECTRICITY.

ELECTRIC CANAL PROPULSION will yet become almost or quite universal. The following from *Engineering* refers to canal propulsion by means of storage batteries operating upon ordinary propellers. A more ready and convenient way would seem to be the employment of the trolley system, as the wires could be readily placed overhead and need never be in the way of traffic. The *Engineer* says: Propulsion by electricity is effectually demonstrated at the Edinburgh Exhibition. The site is skirted by the Union Canal, and four launches are running on the canal. The dimensions are, 40 feet long, 6 feet 6 inches beam, and the draught of water is 2 feet 1 inch. They each carry 40 passengers. The electrical equipment is similar to that used on the Thames launches. The charging plant consists of a 25-horse power engine and an Immisch dynamo, and the switch arrangement is suitable for charging all the four launches at the same time. The recharging is done during the night and the launch can run from 10 to 12 hours. The motors are capable of an output of about $3\frac{1}{2}$ brake horse-power, working up to 800 revolutions per minute, and the speed with the maximum load on board is six miles an hour. The propellers are coupled direct to the motor shafts. A hall-bearing thrust block is attached to the motor's bed and is constructed in combination with the plain bearing of the motor. This is the invention of the Messrs. Immisch, and has been patented by them. The steering, starting, and reversing gear is so arranged that one man has the launch entirely under control. These, so far as we can learn, are the first electric launches which have been worked commercially in Scotland.

TINTING INCANDESCENT LAMP BULBS.—The incandescent electric light may be greatly improved and made much more effective by giving the bulbs a tint of some kind. This can be quite readily done in the following manner: Prepare the glass by thoroughly washing in soap and water and drying. Then dip in bath (made by beating up the whites of two eggs in $1\frac{1}{2}$ pints of water, and filtering) and hang up to dry. Dissolve the aniline color in photographer's common collodion. Red or blue aniline will form clear solutions, while the green solution will require filtering. Yellow aniline forms a handsome color, but the surface of the glass presents a frosted appearance after the application. Violet and purple colors may be obtained by combining red and blue in different quantities. When the solution is ready, dip the prepared glass bulbs therein, hang up to dry, and finally pass a current to the bulb for half an hour, that the heat thus generated may harden the collodion. The preparation can easily be removed by alcohol or sulphuric ether, but is not effected by water. Experience has shown that the best results are obtained by not using too much aniline. Make the color light rather than deep, and apply two or three coats.

LOW PRICES OF ELECTRICAL APPARATUS.—The Edison Electrical Company, in order to induce a more general introduction of electrical appliances into the industries of the country, has given notice of a general reduction in price of electrical apparatus by a very large percentage—in some cases fully 50 per cent. There has no doubt been a very large profit in such manufacture heretofore. During the time in which the Brush Electrical Company practically controlled such manufacture, it is said the profits of the company were fully 300 per cent on its dynamo and most of its other manufactures. Competition has since greatly reduced such profits, and the Edison Company has been the chief factor in such reduction. That company has now taken another long step in the same direction, and all other companies must follow suit or lose business. The electrical industry has become one of the leading ones of the day, and any material reduction will undoubtedly give it a greatly increased rapidity of growth. Of course electric lighting and power will be included in the reduction.

ELECTRIC RAILWAYS IN THE VICINITY OF BOSTON.—There is quite a spirited movement afoot for the construction of an electric street railway between Framingham, Mass., Wellesley, and Natick, and it is more than likely such a road will be built ere long. The storage battery cars on the Beverly & Danvers street railway are so great a success that the company is seeking authority to run over more territory.

TELEGRAPH LINES are subject to a great variety of pests. In Rio, for example, there is an orchid that incrusts the wire and causes leakage. In Japan, the large web of a spider, dripping with rain or dew, frequently interrupts the traffic; while in Norway a large species of woodpecker raises havoc with the poles.

LIVERPOOL is building its first overhead electric railway. The line will be $5\frac{1}{2}$ miles long when completed and the columns have been erected for over one mile. The line will be worked by electric locomotives.—*London Electrical Engineer.*

GOOD HEALTH.

Prevention of Consumption.

The health department of the city of Providence has issued the following circular:

Consumption causes more deaths than any other disease the human race is subject to. Nevertheless it is to a very large extent preventable. It is, though not generally known, a contagious disease. Consumption, or pulmonary tuberculosis, is in every case caused by disease germs which grow in the lungs in enormous numbers. When a person is sick with this disease, these germs are coughed up in great quantities in the expectoration, and when this becomes dry and crumbly, or is trodden to dust, the germs float about in the air and are liable to be breathed into the lungs of any one. If the lungs of the person who does breathe them are poorly developed, or if the constitution is feeble, the germs are very sure to grow and cause the disease. Unfortunately, we do not know how to kill them when they are once in the air-passages. The best that can be done is to build up the system and strengthen the lungs by the use of cod liver oil, good food, and fresh air.

Much, moreover, can be done to prevent the spread of the disease by destroying the germs as completely as possible in every case.

(1) No person with consumption should ever spit on the floor or in the street. If handkerchiefs or bits of cloth are employed, they should at once be disinfected or burned. A good plan is to use a small wide-mouthed bottle with a rubber stopper. The contents should be thrown into the fire and the bottle and stopper thoroughly soaked with boiling hot water every day.

(2) The dishes used by a consumptive should be at once disinfected, and the unwashed underwear and bed-clothing should be thoroughly boiled as soon as possible.

(3) When a person with consumption has diarrhea, the discharges from the bowels should be at once disinfected, as at this time they contain the disease germs. A good way is to add a half-teaspoonful of fresh chloride of lime, or fill up the chamber vessel with boiling water.

(4) No one with consumption should sleep in the same room with another person, and the room occupied by a consumptive should be thoroughly cleansed as often as possible.

(5) No mother with consumption should nurse an infant, and children ought never to be taken care of by a consumptive person.—*Boston M. and S. Journal.*

BRAIN WORKERS AND ATHLETICS.—Life is puzzled over the career of the late Cardinal Newman and John Boyle O'Reilly. The former was a frail, slight man of infirm constitution, but despite this he lived to a very advanced age; the latter was a man of pleuritic physique, who kept his system in training by physical exercise, athletic sports, and followed all the suggestions of modern physical culture. Yet he died in the prime of life. Shall we not, then, live quiet, ascetic lives, ignoring the body and cultivating the spirit? Or shall we cultivate both body and mind? The latter course is the one so much commended to-day; yet it is not a sure passport to longevity, as many cases prove. In fact, the brain-worker is better if he lives a regular, temperate life, and pays no attention to the development of his muscles. A little walk, some fresh air, and sound sleep are all he needs. Some people, to be sure, can be athletes and do brainwork also, but it is not the rule. A sound mind should have a sound body, but it does not need herculean muscles. The best athletic work is done by growing boys and adolescents, who have an extra supply of vitality. When they have matured, and undertaken the responsible work of life, they speedily drop out of the championship; and the lesson we would draw from the opposite cases brought up by Life is that athletics are not needed by brainworkers, and will, if carried to excess, shorten life rather than lengthen it.—*Medical Record.*

TO TELL THE APPROACH OF DEATH.—Dr. Chiappoli states that he has frequently noticed in patients, apparently very far from death, an extraordinary opening of the eyelids, so much so as to give the eyes the appearance of protruding from their orbits, which he considers an invariable sign that death will occur within 24 hours. In some cases, when only one eye is wide open while the other remains normal, death will not follow quite so rapidly, but will take place inside of 72 hours, there not being the slightest chance for recovery after these symptoms set in, however remote final dissolution may seem to be. Chiappoli says he is utterly at a loss for an explanation of this death symptom, but ascribes it to a diseased state of the sympathetic nerve.

NUTRITIVE PROPERTIES OF CREAM.—The fact is not so well known as it deserves to be that cream constitutes an admirable nutriment for invalids. It is superior to butter, containing more volatile oils. Persons predisposed to consumption, aged persons, or those inclined to cold extremities and feeble digestion, are especially benefited by a liberal use of sweet cream. It is far better than cod-liver oil, and besides being excellent for medical properties, it is a highly nutritious food.

ENGINEERING NOTES.

A New System of Tunneling.

Those who are familiar with tunneling operations and subway and sewer construction in towns are well aware of the importance of preventing subsidence of the surface after the completion of the work. The most frequent cause of subsidence is that, to admit of the usual system of timbering, ground beyond the limits of the permanent brickwork is disturbed or removed. As it is seldom replaced by packing as solid as the original ground, settlement ensues sooner or later. A new method of tunneling has been invented by Messrs. Jennings & Stannard, 94 Victoria street, Westminster, London, which obviates this fruitful source of trouble and expense, as by its use no ground outside the actual section of the subway need be disturbed. The system in question comprises a series of steel bars, which are placed side by side within the excavation, so as to form a complete temporary lining and support to the roof. Within this series of bars the permanent brick arch of the tunnel is built. The system has been adopted in the construction of the new relief tunnel of the Great Northern Railway at King's Cross.

The bars used in this work are 10 feet long, 6 inches wide, and 2 inches thick, and are provided at their edges with longitudinal grooves, by means of which each is linked to the next one in such a way as to admit of separate longitudinal motion, and yet to prevent lateral separation. The bars are inserted and supported in the same manner as ordinary tunnel bars, the ground being excavated only the exact section of the tunnel, plus the trifling thickness of the bars. After the brickwork has been built within them, the bars are separately pushed forward by screw jacks, as the ground is excavated for the succeeding length. The bars are provided with longitudinal tubular cavities, through which grouting or other filling material may be introduced from time to time, to fill the space left vacant by the advancing bars between the top of the lining arch and the earth above and around, and this prevents any subsidence.

With regard to economy, it is said that at the King's Cross tunnel, experience has shown that, besides a great saving of time, there has been a reduction, as compared with the ordinary method, of about 50 per cent in the cost of all the work effected by the new method. The invention will unquestionably facilitate the construction of tunnels, subways, and sewers, in cases where it is necessary to support the superincumbent earth and to prevent subsequent subsidence of the surface. The system marks a solid advance in the construction of tunnels, and reflects credit on its inventors.

Wind vs. Steam.

In current calculation as to the cheapening of power wherewith to turn the armatures of dynamos for the generation of electricity, the utilization of the power of the air in motion is ignored. Some years ago Sir William Thompson, the great English electrician, predicted that windmills would be used ultimately for charging storage batteries, and that power has been utilized thus in some localities. The multitude of windmills used for pumping water is enormous. The windmill can be used with equal success for operating light dynamos and charging the cells of storage batteries.

Wind, of course, is an intermittent power. Its force is calculated for an average duration of eight hours out of 24. In the Northwest the average would be much longer than that, as there are very few calm days in the year. The windmill of the present day is a very superior affair to the old canvas sail. It is light, strong and automatic, answering the varying direction of the wind. It is made of wooden slats, and the rudder keeps the disc to the wind. After the disc is set up, the only expense is oiling and occasional repairs. The expense, in fact, is a mere bagatelle to steam-power.

Wind-power is the cheapest on earth. It can be used in many cities with ease to charge all the batteries necessary to light every house in the place, and furnish power where needed. The subject is worthy of public attention. With the growth of the use of accumulators, the wind-power must come in as the chief agent for charging the cells. Its convenience and cheapness recommends it. Nobody can monopolize the wind. It is free to all.

UTILIZE THE BROOKS.—Says the *American Contract Journal*: In the rivers rolling to the sea are millions of horse-power daily running to waste. We do not appreciate the brook and river because they are so near and have been there so long. Had they commenced flowing but to-day, we would have hastened to harness them.

A FRENCH ENGINEER proposes to pen up the tide-water at Havre, and, by running turbines from this 16-foot rise and fall of the water level, to create and transmit to Paris 42,000 electrical horse-power. The Bay of Fundy may yet be harnessed down to the factories of New England.

PUMPING NATURAL GAS WELLS.—Successful experiments have been made in pumping natural gas wells to increase the flow.



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Saturday, January 10, 1891.

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Passing Events.

The Legislature has convened at Sacramento, and, having pretty well finished with its appointments to office, will soon be at work on bills. Already a number have been introduced and many more are to follow. We shall, as usual, have something to say concerning those measures which interest our special class of readers.

The trouble with the Sioux Indians still continues, and as we write (Thursday) it is believed a battle is in progress.

The U. S. Senate is still considering the free coinage of silver, but little progress is made. It is unfortunate that silver should be mixed up in political questions as it seems to be, for the subject is not dissonant as to its merits as would otherwise be the case.

The U. S. Debris Commissioners, who have been investigating the question of the mining debris with its relation to the navigable rivers of the State, have completed their report and will forward it to the War Department this month.

The Utica mine, at Angels, Calaveras county, seems unfortunate in the matter of accidents. Last year 13 men were killed by a cave in the mine, and on Monday of this week 10 men were killed by the breaking of the wire cable attached to the cage.

MINING improvements in Pima county, Arizona, were never progressing more rapidly or more favorably than at present.

The Apex Law and the Square Location.

Next to the determination and settlement of land titles, the ownership of mining claims has been in California the most fruitful source of litigation, the greater portion of this litigation having grown out of the question of side lines or its equivalent. So generally has this been the case that a very radical change in the statute governing in this respect would seem to be demanded. Under the law as it now stands the claim owner may follow and work any lode having its apex or croppings within his surface lines even though it extend in its downward course outside those lines. There has come to be developed a strong public sentiment in favor of substituting for this law one providing for square locations, and confining the rights of claim owners within their surface boundaries.

In other words, it is proposed to make our mining laws conform in this respect with those of all other civilized nations, bringing them at the same time into harmony with our practice as regards placer, coal, stone, agricultural and all other land claims, the owners of which have no right to go outside their surface lines. Within these lines they may go downward without limit, but laterally not a hair's breadth over them. With a law like this the doubt and obscurity that now invests this species of property would disappear, and all would be rendered plain, fixed and certain. Instead of having recourse to legal proceedings, involving a necessity for lawyers, helliffs, courts and juries to settle disputes about ore bodies, the services of an expert surveyor would suffice to determine a question of this kind at little cost and in a very short time.

It might be thought that a law enacted so many years ago, and which has since been the subject of so much adjudication, would by this time have become so well understood that its workings could give rise to but little controversy. But this is a misapprehension. It has been, as already remarked, a prolific source of litigation. Scores of suits have grown out of it, and they continue to multiply year by year. The court calendars are crowded with them, and not always have the findings of the various courts been in harmony. The opinions of the several judges have sometimes been in conflict, leaving the law in such particular cases unsettled and doubtful. Even in the Supreme Court of the United States, a minority have at times dissented from the findings of their brethren on the bench. And so this very uncertain law has on occasion been rendered still more uncertain by the acts of its ablest interpreters.

If the judiciary, perplexed and in doubt, has called to its aid the learned geologist, the mining expert and others skilled in rock formations, vein systems, dips, faults, dips, spurs and angles, these specialists have not infrequently been found so divided in opinion that the judicial mind has, through these helps, been only the more bewildered where it sought for guidance, and the judicial vision only the more obscured where it sought for enlightenment. The truth of this statement is well exemplified in the manner in which we find these authorities arrayed against each other in the suit now on trial in Los Angeles, and to which some allusion was made in these columns last week.

Here we have six professionals, all honest, capable and experienced, pitted against each other, three on a side, their testimony being, presumably, entitled to equal weight. What is the court and the jury to do in a case of this kind? Of course find for the side on which there seems a preponderance of evidence, which is hardly more than making an intelligent guess or striking in the dark.

Now, clearly, much of this obscurity, perplexity and doubt would be obviated were the plan of making square locations and restricting all within their surface limits adopted in place of the present apex theory, which in all these legal contests constitutes the principal element of uncertainty. To continue this apex clause in the law governing mining locations will be but to perpetuate these costly feuds and hequeath to coming generations a heritage of enmity and strife.

THE recommendations of the International American Conference for the establishment of an American Monetary Union, and the issue of a common silver coin, have been adopted by all the American Republics except Guatemala, Uruguay and Paraguay, which have not yet been heard from.

The Wet and Dry Seasons of California.

For half of the year or more, the people of California are apt to pay little attention to the subject of meteorology. They meet and salute each other without making, as at other times, any allusion to the condition or prospects of the weather. The period during which the weather causes such little concernment covers what is here known as the dry season of the year, extending usually from about the middle of April to the middle of November, during which the rainfall hardly ever exceeds an inch or two, it sometimes amounting to less than a single inch.

But if, during these seven months, we so dismiss this weather topic wholly from our thoughts, it does none the less occupy them largely for the other five months of the year, which we designate the wet season. Any rain falling here between the end of May and the middle of October is generally deprecated, as causing more harm than good. On the other hand, any great delay in the commencement of the wet season, or the occurrence of a protracted drought after its advent, is here equally to be dreaded, because of its injurious effects on most of our leading industries. Such condition hurts alike the business of mining and of farming, owing to the water supply being insufficient for their successful prosecution.

But while so much mischief inevitably comes of a winter drought, any great superabundance of rain works at this season equal harm, the flooded rivers sweeping away the miner's mills, dams, ditches and other plant, and so saturating the ground with moisture that plowing and seeding are delayed and the growing crops more or less damaged, they being sometimes wholly drowned out.

And thus the winter or wet term becomes in California a season of constant anxiety and conjecture, every class thinking and talking about it, because all are interested in the way it shapes. About mid-autumn it is the wont of the weather-wise among us to begin speculating as to the probable character of the coming winter, these speculations being based on a variety of facts or supposed facts, such as the movements of the wild fowl and other migratory birds, the habit of the woodpecker and the ground hog, the flow of the springs, etc.

Strangely enough, these weather prophets never agree in their conclusions. Professing to be guided by the same signs, they either see these differently or put upon them a different construction, about one-half of them every year prognosticating a wet and the other half a dry season. Going back only a few weeks, we find these people thus divided in opinion, one set telling a wet and the other a dry winter, neither of which predictions has thus far come to pass, the weather having been marked by neither extreme. Up till this time the winter has in fact been an exceptionally favorable one. We have everywhere had enough rain and nowhere too much. The meteorological conditions could hardly have suited us better had they been prepared to order. Though a little tardy, the rains, since they commenced, have been well timed and plentiful, the grass and early-planted grain having been started into vigorous life, while plowing followed by extensive sowing has everywhere been made possible. The flow of the rivers has been so increased as to improve navigation and afford the miners an abundant supply of water, the rise in the mountain streams having at the same time been so slight as to greatly prolong the working season of the river-bed miners.

But while the present has so far been a model winter, being as yet not half over, there remains, of course, a chance that a damaging drought or a damaging flood may occur before it is ended. As far as it has gone, it tends to discredit the vaticinations of these weather oracles and to such extent impair confidence in their ability to divine the future conditions and movements of the meteorological elements. There seems, in truth, to be no infallible or even tolerably safe rule whereby these things can be foretold.

As regards our summers, it is otherwise. It takes not much of a prophet to foresee what will be the general character of one of these. The wet season over, we have for the next six months little need for the signal service or the part of the almanac that speaks of meteorological changes. The rubber coat and the gum

hoot are now relegated to the lumber-room. The umbrella, the possession of which could herefore be maintained only by the greatest vigilance, may now be safely left in any exposed place, no other article being so little coveted because no other is so little needed. The street-sprinkler must now work without intermission; not here, as in most other countries, may he remain half the time idle. We dry our green fruits largely in the sun and make salt in the open air, and not, as elsewhere, in vats protected by sliding roofs that may easily be run over when the rain comes on. The farmer stacks his soaked grain in the field and there leaves it till he cares to haul it away or the near approach of the rainy season makes this necessary.

The foregoing, while they include some of the more notable, comprise but a small part of the benefits incident to the calm, rainless summers of California; nor are our mild and open winters without their advantages; outdoor work during this season goes on with little interruption. Planting, plowing and seeding are everywhere successfully prosecuted, mining and lumbering, except in the higher mountains, receive no check, this being, in fact, with most of our leading industries the most busy season of the year.

Patents.

In the year 1890, the U. S. Patent Office issued 26,292 patents, being over 2000 more than any previous year in the history of the office. The total number of patents issued to January 1, 1891, aggregates 443,986; designs, 20,438; reissues, 11,136; trademarks registered, 18,774; labels, 6402.

It will doubtless be a surprise to many to learn that, notwithstanding the great number of patents already issued, the annual number is on the increase, and was last year greater than ever before. But there is good reason for this. The great multiplication of mechanical appliances in all the various branches of human industry calls for improvement in methods and in details, and inventors are kept busy in all directions. There are also many new branches, such, for instance, as electrical appliances, which offer fine fields for the inventor.

It is, moreover, now a well-recognized fact that no improvement is too small or unimportant to cover by patent. Every improvement simplifying or increasing the efficiency of any mechanical appliance adds so much to its value. Therefore the men who improve any well-known and commonly-used article may reap as much reward as the person who devises an entirely new thing, which must yet be introduced into public use.

The Pacific Coast is not behind the rest of the country, in proportion to its inhabitants, in the matter of inventions. In the last year 817 patents were issued to inventors in California, Oregon, Washington, Nevada, and Arizona. This is an evidence of our industrial progress and inventive talent. The majority of these Pacific Coast patents were obtained through the MINING AND SCIENTIFIC PRESS Patent Agency and very many of them are of considerable value and importance.

The Utica Mine Accident.

On Monday of this week, while ten men were on the skip of the Utica mine, Angels, Calaveras Co., the hoisting rope broke, dropping them 450 feet to the bottom of the shaft, killing them all. The cable has only been in use three months, is of steel, 1½ inches in diameter, and should carry many more tons than were on the cage. It is said there was a jar or shock before the rope broke, as if a steel bar or other implement had caught in the timbers.

No details of the accident have been received as yet, so the reason why the safety clutch did not catch is not explained. It is assumed, of course, that such mining men as Hayward & Hobart, the owners of the mine, would not allow the cage to be operated without a safety appliance. However this may be, the cage dropped to the bottom of the shaft, when the rope broke, and all the men in the cage were killed.

It was in this same mine that a number of men were killed by a cave in December, 1889. It had rained steadily for some weeks previous to the accident and a number of men were sent down to repair the timbers, when without any warning the earth crushed in on them and killed them all. Four of the bodies were recovered only three weeks ago, and four are still in the debris of the shaft.

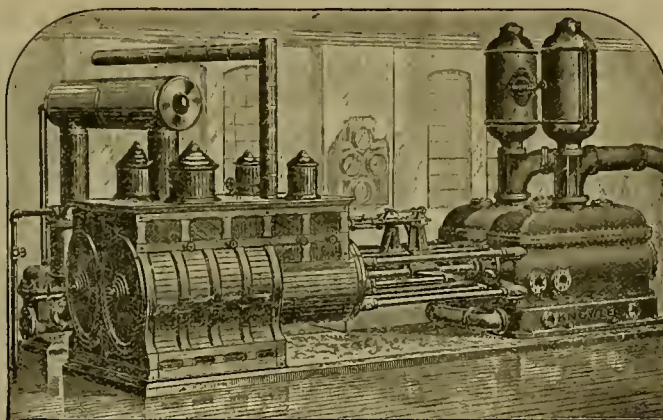
Terraced Overflow Basins.

Among the many interesting natural phenomena that claim the attention of the visitor to the Yellowstone National Park, the geysers and hot springs rank first in general interest. Their novelty and beauty attract universal admiration, while the vast quantities of hot water that flow from the ground are convincing evidences of the nearness of internal heat. These steaming fountains and boiling pools are usually surrounded by snowy white borders of mineral matter deposited by the hot waters.

At the Mammoth Hot Springs this consists of carbonate of lime that forms the fretted rims of the pools and the beautifully beaded and coral-like deposits of the cones, and covers large areas of ground about the springs with a sheet of white and glaring slt. Not only are the occurrence and the nature of these deposits such as make them of interest to every visitor, but the problem of their origin has proved to be one of the prominent features in the scientific investigation of the hydrothermal phenomena of the park, as it has been found that such deposits are very largely due to the growth and life of a brilliant colored alga vegetation, living in the hot waters.

Although the Yellowstone Park abounds in hot springs, calcareous hot waters are extremely rare and but one locality is known where such springs have formed deposits of travertine or calcareous tufa to any considerable extent. This is the Mammoth Hot Springs. At this place the heated waters rising through mesozoic limestone reach the surface heavily charged with carbonate of lime in solution, which is deposited by the hot waters in the form of travertine, affording an excellent opportunity for a study of the formation of this mineral. There are few places in the world where such deposits equal those of the Mammoth Hot

usually irregular, wavy and scalloped. The water runs over the rims in thin sheets and little cascades, depositing travertine wherever it flows and constantly building up the basins until the flow is checked by the increased height of the rim. Yellow sulphur-coated algae threads are abundant on the bowl of the spring and the rapid-flowing streams, but the exquisite blues and greens of the hottest basins



KNOWLES' COMPOUND DUPLEX PUMPING ENGINE.

are due solely to the depths of water. The bright lemon, red and green shades of the cooler pools are, however, entirely vegetable in their nature, and due to the presence of algae lining the basins and stripping their outer walls. In a general view of the entire collection of these basins, obtained from the edge of the terrace above, the effect is that of a brilliant mosaic, the colors occurring in well-defined areas outlined by the travertine rims. Looking at the pools nearer by proves that these colors are not

The Knowles Water-Works Pumping Engine.

The accompanying illustration represents one of the latest and most improved compound condensing duplex water-works pumping engines made by the Knowles Steam Pump Works. Parke & Lacy Co. of this city has just sold one of these pumps to Mr. H. Bloomfield,

engineer of this city, for the water works at Lewiston, Idaho, the dimensions of which are as follows: Two 12" diam. H. P. steam cylinders; two 22" diam. H. P. steam cylinders; two 12" diam. water plungers; all 18" stroke.

The water ends are made in two independent castings, from very best charcoal iron, and are fitted with hand-hole plates for easy access to both suction and delivery valves.

The delivery from each water cylinder is through an elbow into a "Y," and on top of

conducting material, over which is placed a handsome black-walnut lagging fastened with brass bands. The piston rods in the steam ends are of steel, one rod for each high-pressure steam piston, and two rods for each low-pressure piston, passing through barrels cast on the outside of high steam cylinders, all three rods taking hold on a common cross-head with the piston rod from the water end, thus bringing the stuffing-boxes all out in front of the lagging where they are in sight at all times and can be easily packed without removing lagging, etc.

The steam end and water end are connected by eight heavy, wrought-iron, polished tie-rods. The valve motion is very heavy and strong, consisting of two wrought-iron rock shafts working in adjustable babbitted boxes, wrought-iron rocker arms and connections all made with adjustments for taking up lost motion.

Each high-pressure steam chest is fitted with a throttle valve and these two throttles are connected to a "Y" to which is fitted a main throttle valve.

This pumping engine is fitted with the latest and most improved independent air pumps and jet condensers, the air pump having 7" steam cylinders, 10" vacuum cylinder, 10" stroke. The air cylinder is lined with a heavy composition bushing; the air piston is of composition fitted with adjustable fibrous packing; the piston rod of composition; the valve plate of composition, and the valves of rubber, fitted with brass bolts and springs. The condenser is of the latest improved cone pattern, fitted with vacuum gages, etc.

In the exhaust-pipe from the low-pressure steam cylinders to the air pump is placed one of the latest improved feed-water heaters, which is lagged with black walnut fastened with brass bands to correspond with the lagging on the main engine. The feed-pump takes its supply from the air-pump discharge, and forces the water through the heater, furnishing hot feed-water to the boilers.

The duty of the plant is 50 to 60 million foot pounds and its daily work consists of pumping 1,500,000 gallons with a head equal to 240 feet, including the suction and friction of the water pipe. This pumping engine throughout is handsomely finished and in keeping with the high class of machinery always furnished by the Parke & Lacy Co.

Academy of Sciences.

The California Academy of Sciences held its annual meeting last Monday in the new building on Market street. Dr. H. W. Harkness presided. Reports were received from the Board of Trustees. The treasurer reported disbursements for the year amounting to \$182,669 22; cash on hand, \$1231.02. The librarian reported 2694 books received during the past year. Reports were also received from the Curators of Ornithology and Ichthyology. The president made a brief summary of what the society had accomplished during the year.

The Committee on Elections reported the following officers elected to serve for the ensuing year: President, H. W. Harkness; first vice-president, H. H. Behr; second vice-president, George Hewaton; corresponding secretary, Frederik Gutzkow; recording secretary, J. R. Sonham; treasurer, L. H. Foote; librarian, Carlos Troyer; director of museum, J. G. Cooper; trustees, Charles F. Crocker, D. E. Hayes, W. C. Barnett, George C. Perkins, E. J. Molera, Irving M. Scott, John Taylor.

The committee also reported that an amendment to the Constitution had been adopted making two classes of members, and those now joining can only do so as annual members without the privilege of voting.

A discussion on this amendment took place. Colonel Charles F. Crocker said that he was very sorry that he had no opportunity to express his opinions prior to the election. This amendment would prevent many from joining the association, and he did not believe it would meet the views of either James Lick or Charles Crocker if they were alive. He was sorry that the amendment was considered practically settled.

I. E. Thayer said that there was nothing on the ticket to indicate what amendment was voted on, and he did not believe it had been adopted.

The secretary said that the amendment had been properly advertised for 60 days in accordance with the provision of the Constitution. C. F. Crocker said that it was impossible to determine which amendment was voted on at the election, and as it amended several articles of the Constitution, the amendments should have been voted on separately.

After considerable discussion, the whole matter was declared out of order and the meeting adjourned.



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Springs in magnitude, and none exceed them in beauty.

The terraced overflow basins form the most striking feature of these springs. No description can do justice to their beauty, for neither the delicate fretwork of their walls nor the frosted surface of the glistening deposit nor the brilliant colors of the pools and rims can be described. The accompanying engraving of the Blue Springs, from a photograph by the U. S. Geological Survey, shows a few of the many basins, of which each differs from the others.

The walls are built up of pure white travertine, the surface resembling imbricated shells, or a multitude of miniature basins, and often covered with a brightly-colored vegetable jelly where the water is slightly cooled. These basin walls vary in height from a few inches to several feet. Their outline is rarely crescentic,

pure, but are produced by a number of tints, minute differences in depth producing variations in color in the same basin. Large as is the overflow from the Blue Springs, little reaches the edge of the terrace, the water sinking into the porous deposit or flowing into holes and fissures in the travertine floor.

The Union Iron Works, at Virginia City, Nev., give steady employment to 10 or 12 workmen. The company makes a specialty of mining and milling supplies, and is turning out some excellent work. At present there is comparatively little being done, but the plant is kept in running order and regular repair work is always coming in. Such establishments as this are of decided advantage to mining camps and should be liberally patronized where opportunity offers.

This "Y" is a large delivery air-chamber fitted with glass gauge to show the position of air and water in the same. In the delivery pipe is placed a heavy, strong check valve and also a gate valve for closing off the discharge entirely when desired. The suction to each water cylinder is taken through an elbow with easy bend, the two elbows being connected by a "Y," on top of which is placed a large suction air-chamber. The suction pipe is fitted with a foot valve and strainer, also with a gate valve to shut it off when desired.

The water plungers are made of hard iron and work through gun-metal sleeves. The valves are of medium hard rubber, backed with metal plates, and the valve seats are of brass fitted with brass bolts and springs.

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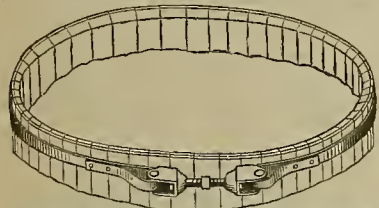
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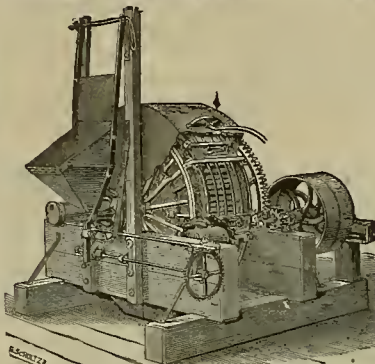
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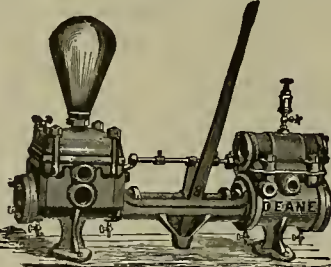
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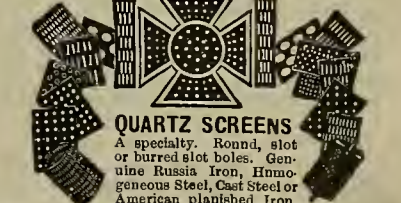
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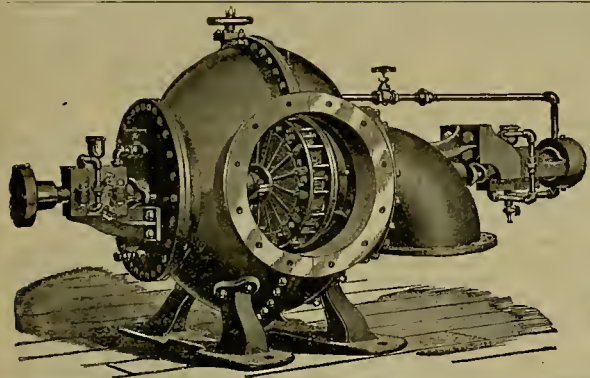
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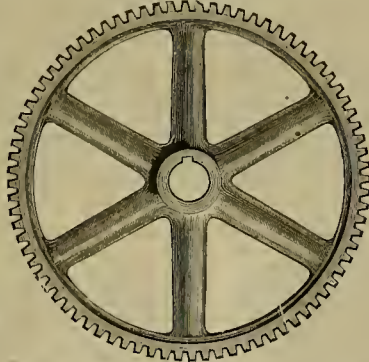
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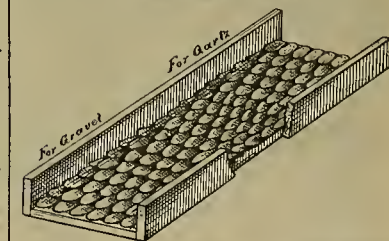
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The Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:

COMSTOCK MINES—NEVADA.		Cash.	Debt.
Alpha	.....	\$15,591	.....
Alta	.....	25,013	.....
Andes	.....	14,002	.....
Belcher	.....	13,934	.....
Bell & Belcher	.....	6,673	.....
Bullion	.....	2,683	.....
Caledonia	.....	4,113	.....
Challenge Con.	.....	7,105	.....
Chollar	.....	33,239	.....
Cou. Cal. & Virginia	.....	67,236	.....
Confidence	.....	0.579	.....
Con. Imperial	.....	34,435	.....
Con. New York	.....	9,178	.....
Crown Point	.....	128,566	.....
East Sierra Nevada	.....	1,381	.....
Exchequer	.....	3,978	.....
Gould & Curry	.....	7,991	.....
Hale & Norcross	.....	07,900	.....
Justice	.....	4,194	.....
Kentuck	.....	7,034	.....
Lady Washington	.....	1,982	.....
Mexican	.....	8,333	.....
Mexican	.....	15,364	.....
Occidental	.....	16,364	.....
Ophir	.....	22,206	.....
Overman	.....	13,107	.....
Potosi	.....	154,874	.....
Savage	.....	48,947	.....
Scorpion	.....	6,874	.....
Seg. Belcher & Midee	.....	1,756	.....
Silver Hill	.....	125	.....
Sierra Nevada	.....	16,370	.....
Union Con.	.....	1,389	.....
Utah	.....	77	.....
Utah	.....	831	.....

TUSCORA MINES—NEVADA.		Cash.	Debt.
Belle Isle	.....	22,999	.....
Commonwealth	.....	47,593	.....
Del Monte	.....	18,213	.....
Found Treasures	.....	13,20	.....
Grand Prize	.....	8,199	.....
Independence	.....	2,197	.....
Nevado	.....	14,925	.....
Nevado Queen	.....	19,568	.....
North Belle Isle	.....	7,542	.....
North Commonwealth	.....	5,793	.....

CANDLERIA MINES—NEVADA.		Cash.	Debt.
Holmes	.....	443,663	.....

BODIE MINES—CALIFORNIA.		Cash.	Debt.
Bodie Con.	.....	24,083	.....
Bulwer	.....	2,662	.....
Mono	.....	11,990	.....
Standard	.....	1,756	.....
Syndicate	.....	3,641	.....

ARIZONA MINES.		Cash.	Debt.
Crocker	.....	3,065	.....
Locomotive	.....	502	.....
Pear	.....	4,268	.....
Pearless	.....	6,497	.....
Weldon	.....	5,005	.....

* Mine expenses for December not included.
(a) Also \$12,630.30, net proceeds of sale of concentrates.
(b) Bullion valued at \$47,737.30 on hand, with shipments to arrive.
(c) \$1,596 to be collected on assessment. Due for royalty, \$1,040.
(d) Bullion valued at \$3,665.71 on hand, Suto Tunnel royalty included.
(e) Also liability of \$33,849, due for royalty.
(f) Including \$14,233 received for concentrates.
(g) \$8,794 due for royalty.
(h) 13,116 ounces of bullion as an offset.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

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THE BRITISH SOUTH AFRICA COMPANY.

MEMORANDUM

Of the Terms and Conditions upon which Persons are Permitted to Prospect for Minerals and Metals in Mashonaland.

Prospecting Licensees.

1. Any person may take out a license on binding himself in writing to obey the Laws of the Company and to assist in the defence and maintenance of Law and Order if called upon to do so by the Company—such license to bear a stamp of the value of one shilling.

Right of Prospecting Holders to Peg Off Claims.

2. Every license-holder is free to peg off one alluvial claim and ten quartz reef claims in block. When the claims have been marked off the same shall be registered and the license-holder shall receive a certificate of registration—such certificate to bear a stamp of the value of half a crown.

Size of Claims.

3. Alluvial claims are in extent 150 feet by 150 feet. Quartz reef claims are in extent 150 feet in the direction of the reef and 400 feet broad. The claimholder may follow the reef in all its dips, spurs, angles and variations.

Terms on which Quartz Reef Claims may be Held.

4. Every registered quartz reef claim is to be held by the prospector on joint account in equal shares with the Company, and every transfer, hypothecation or lien of his interest in such claims is subject to the rights of the Company.

Registration of Alluvial Claims.

5. Certificates of registration of an alluvial claim or portion of claim in any alluvial digging are to be covered by a stamp of £1 for each month for which such claim or portion of claim is registered, payable in advance; the Company, however, claim no rights in respect to gold won from alluvial claims.

Discoveries of Alluvial Diggings.

6. The Discoverer of an alluvial digging, distant not less than ten miles from any known alluvial digging, shall have the right to peg out two alluvial claims in addition to his other rights.

Work to be Done on Claims.

7. Every digger shall, within four months from the registration of the block of claims, under penalty of forfeiture of his claim license, sink upon his block of quartz reef claims either a shaft of a depth of 30 feet in the reef or a shaft of at least 30 feet outside the reef with a cross-cut through the reef.

Certificates of Inspection.

8. So soon as the claimholder has done the required amount of work and has given evidence that he has opened up a payable reef, he shall receive an Inspection Certificate to the effect that the required work has been done—such Certificate to bear a stamp of the value of 15 shillings.

Payment of Claim License.

9. Prior to flotation the claimholder shall pay no license. After flotation the license shall be at the rate of 10s (ten shillings) per claim per month.

Flotation

10. On claims being ascertained to be payable, the Company have the right to float them into either a joint stock company or into a syndicate. The Company shall therefore within a reasonable time either make a proposal or decline to do so. If the proposal is accepted by the Claimholder he shall on flotation be entitled to half the vendor's scrip in the shares of the Company so floated. If the Claimholder is not satisfied with the Company's proposals, he has the right within one year to prove to the Company that he is in a position to float on better terms, and he shall on the flotation of the claims, give the Company half the vendor's scrip.

Pegging Out of Additional Claims.

12. Any claimholder shall be at liberty to peg out a fresh block of ten (10) claims.
(i.) When he shall have given notice of abandonment of his existing block of ten claims.
(ii.) When he has received his Inspection Certificate from the Mining Commissioner.

But no claimholder who has acquired his claim or claims as a prospector shall be the registered claimholder of more than two blocks of claims of ten claims each.

Agreement.

13. An agreement, binding prospectors to abide by the Laws of the Company under penalty of forfeiture of rights, is to be signed by all the prospectors either at Kimberley or Tuli.

By order.

F. RUTHERFORD HARRIS,
Secretary.

ITINERARY OF ROUTE.

MAPEKING—100 miles north of terminus of railway, which is now at Vryburg. The latter town is about 150 miles north of Kimberley. Kimberley is 647 miles from Capetown.

DISTANCE FROM MAPEKING ABOUT	
PALMOUTSA—Telegraph Station.....	80 miles
RAMALA—Telegraph Station, Junction of Notwana and Crocodile Rivers.....	200 "
ELEBE—On the Lotsani River.....	280 "
MACLOUTSIE CAMP AND POST—Telegraph Station, Macloutsie River.....	320 "
TULI CAMP AND POST—Telegraph Station, Tuli and Shashi Rivers.....	370 "
VICTORIA CAMP AND POST—35 miles north of the Lunde River.....	600 "
CHARTER CAMP AND POST—Near Mount Veldia.....	750 "
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Assessment Notices.

GRAY EAGLE MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Placer County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 20th day of December, 1890, an assessment, No. 21, of Three (3) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 393 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 25th day of January, 1891, will be delinquent, and all stock for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 16th day of February, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
A. W. BARROWS, Secretary pro tem.
Office, Room 11, No. 393 California Street, San Francisco, California.

INYO MARBLE COMPANY.—LOCATION of principal place of business, San Francisco, California. Location of works, Keeler, Inyo County, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 16th day of December, 1890, an assessment (No. 11), of Ten Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, 132 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 30th day of January, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 20th day of February, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
C. W. LUOE, Secretary.
Office, 132 California Street, San Francisco, California.

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"A RIGID EARTH," being devoted to Geology as Applied to Mining. By STEPHEN BARTON. In this work the author addresses himself to intelligent Miners who have, to some extent at least, familiarized themselves with the accepted theories of elementary geology. He has grouped together numerous observed facts tending to disprove the igneous theory, and to establish the proposition that below the action and influence of the atmosphere all fissures grow narrower with depth—that metal-bearing veins are produced by causes acting near the surface; and that the realm of successful mining never penetrates the earth one mile. PRICE \$2.00. J. O. WARD, General Agent, 64 Main Street, Visalia.

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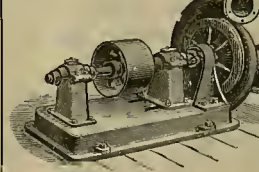
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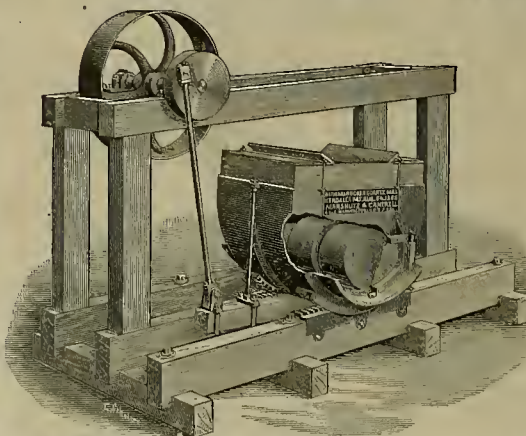
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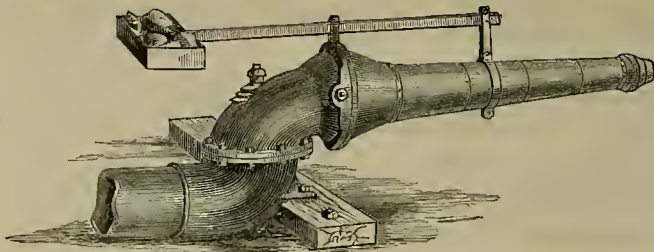
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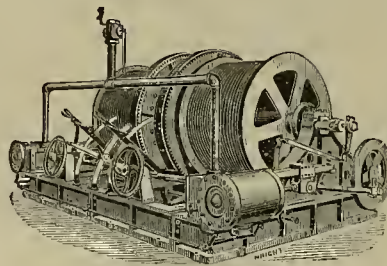
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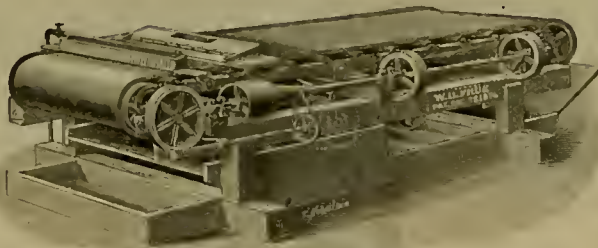
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Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), London, October 8, 1885.
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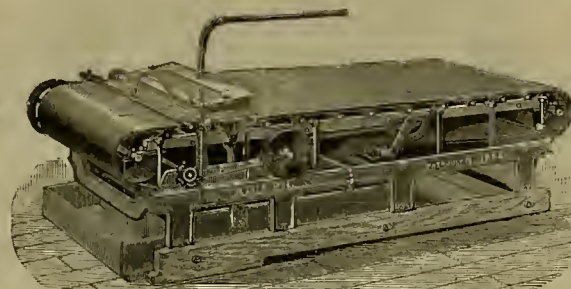
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

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(PATENTED.)

Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.

Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices. DAVID MCKAY, JR., Sup't North Star and Original Empire Mining Co.

N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.



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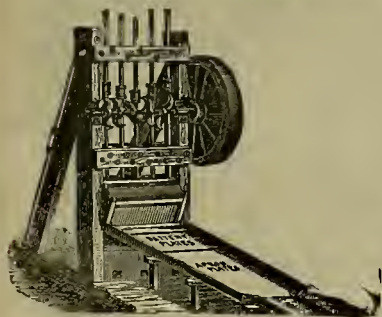
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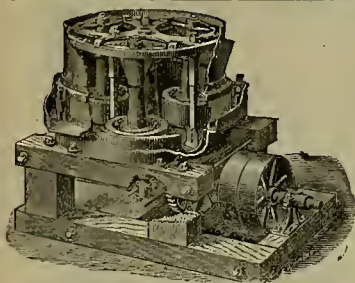


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COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

PARKE & LACY COMPANY

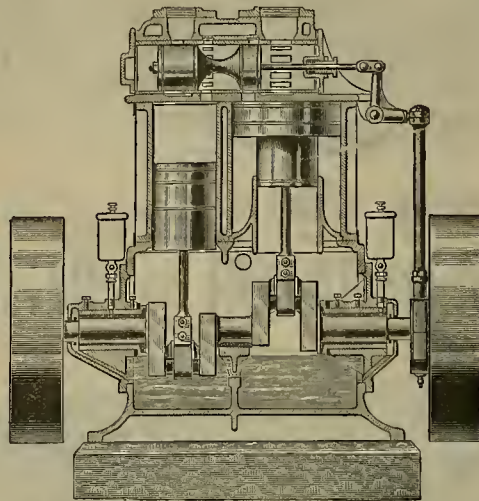
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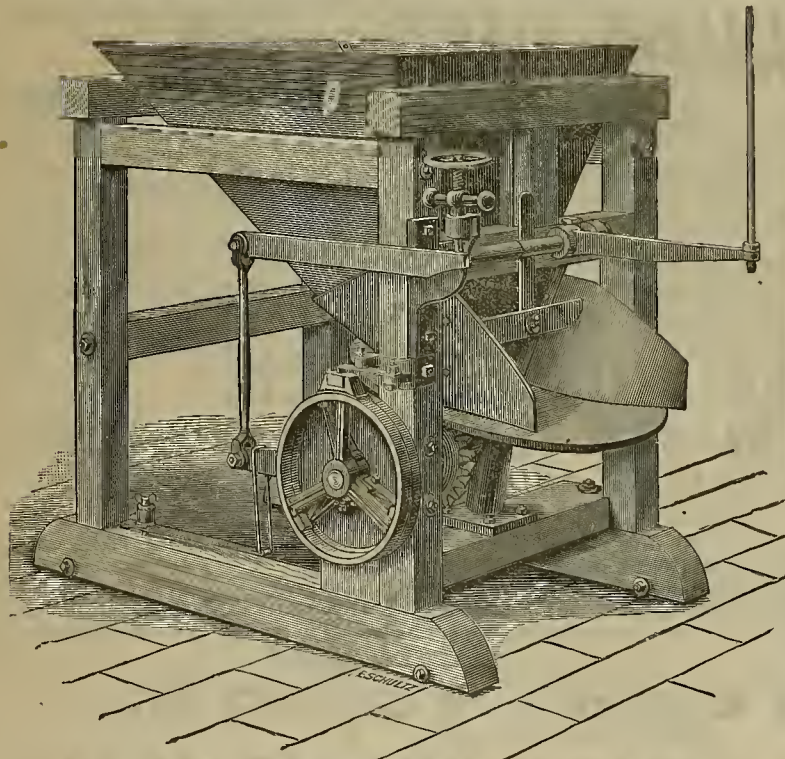
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W. G. ROBERTS, Greenwood, El Dorado Co., Cal. J. R. TREGLOAN, Supt. South Spring Hill Gold Mining Co., Amador City, Cal.

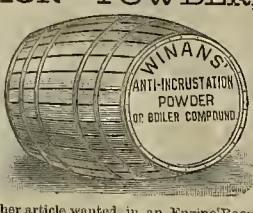
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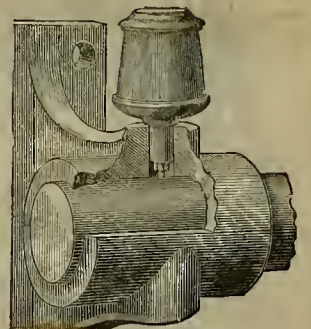
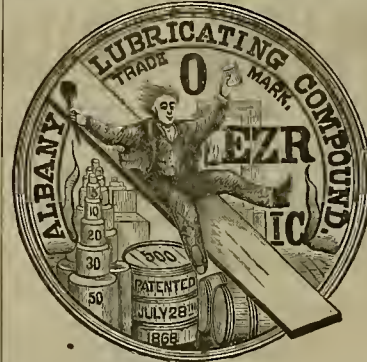
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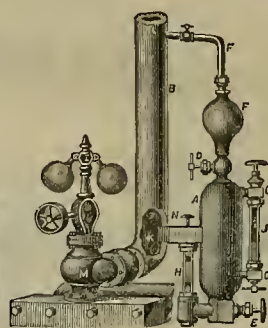
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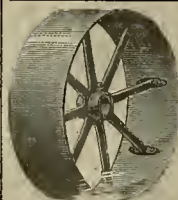
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An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXI.—Number 3.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, JANUARY 17, 1891.

Three Dollars per Annum.
Single Copies, 10 Cts.

The Garnier Ore Concentrator.

The accompanying engraving shows the Garnier ore concentrator made by the Risdon Iron Works of this city.

The table has a peculiar movement, corresponding to a "batea." The vertical shaft seen in front has an eccentric bearing at the top, which gives a rotary movement to the table and its frame at that point. The table is supported at the rear on the pivot studs seen at the side, and also by a sliding bearing in the center behind, which permits a forward and backward movement equal to the throw of the eccentric in front, but no movement sidewise, so the sand on the table is first subjected to a kind of circular batea movement, which gradually changes to a reciprocating one, as the material moves from the front to the rear end.

The machine is started and stopped without shock by means of the bevel friction wheels seen in front, the horizontal shaft running all

the time. The rotary movement of the table is derived from the vertical shaft in front by means of the cone pulleys and a band, as shown. This band is adjusted up or down, while the machine is in motion, so as to regulate at pleasure the movement of the apron over the rollers on which it is supported. The belt-shifter is adjusted and held by the hand-wheels on the stem, and every working part

of the machine is in plain view and accessible.

On the grounds of simplicity and absence of detail, this concentrator has many claims for favor, and supposing its functions, due to the peculiar movement before explained, to have the advantages claimed, the machine will no doubt meet with a wide sale, especially as the process of fine concentration seems to be increasing in favor, and also in adaptation to the requirements of present gold-mining industry in California.

The Sue Mine.

The Sue mine, shown in the accompanying illustration, is in Wall Street canyon, Calico district, San Bernardino county. As the engraving shows, the cliff of rocks, where it is situated, seems almost inaccessible. The lode

is a continuation in the northwesterly direction of the celebrated Silver King mine, and about 4500 feet distant. The mine is owned by Waterman, Porter & Osborne. The developments are largely superficial, the deepest workings not exceeding 100 feet. The vein is well defined and the ores rich. The mine has been let to obliquers who have been working it in a desultory manner.

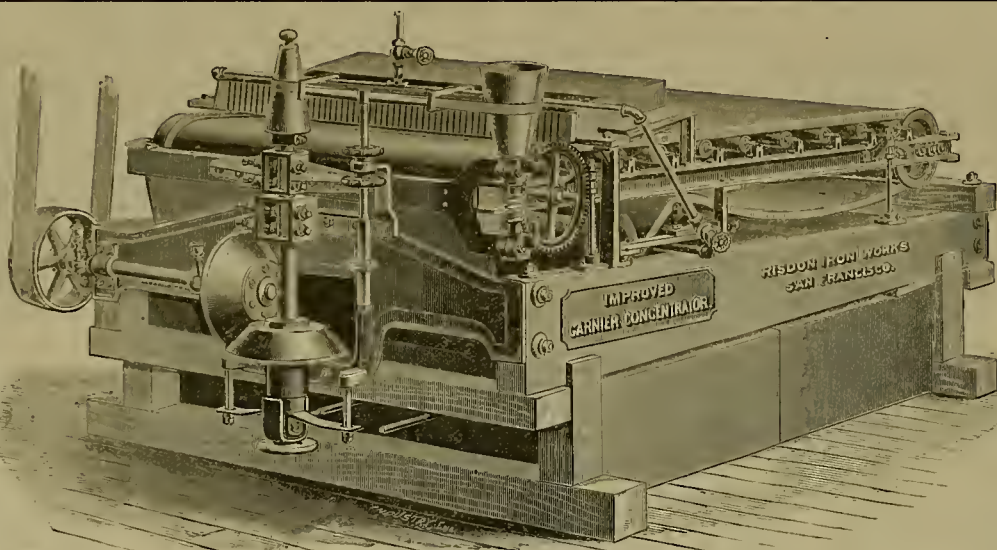
Basaltic Caves.

On the islet of Staffa, off the coast of Scotland, the geological formation is peculiar. Regarded in sections, the rocks are of three kinds, conglomerated tufa, forming the basement; columnar basalt, arranged in colonnades, which form the walls and facades of the chief caves, and amorphous basalt overlying the columnar basalt, but pierced here and there by the ends of columns and by angular blocks.

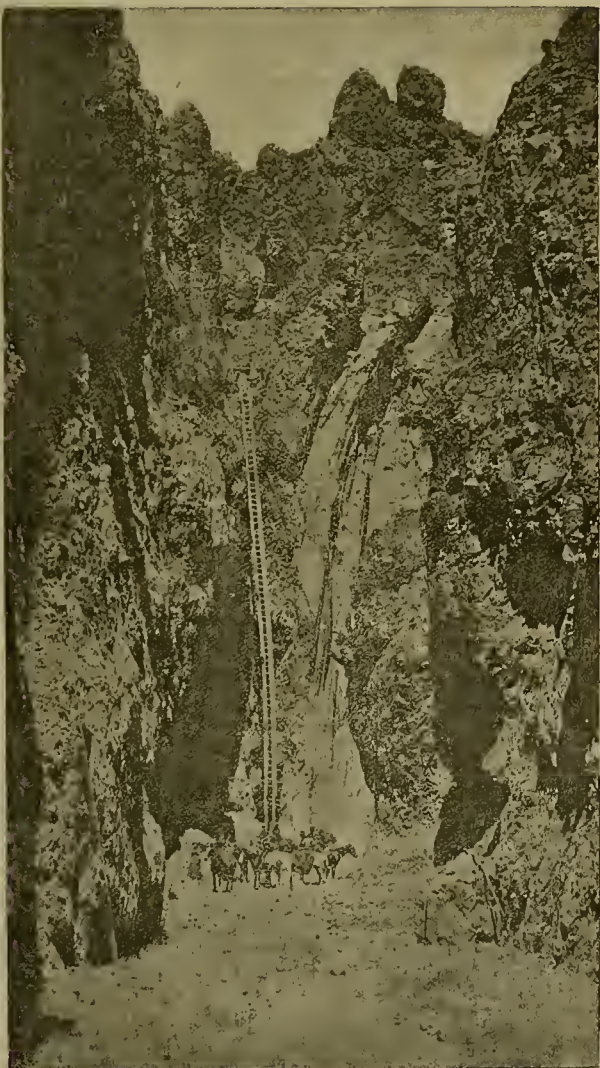
The most remarkable feature of the island is Fingal's cave, the entrance to which is formed by columnar ranges on each side, supporting a lofty arch. The entrance is 33 feet wide and 60 feet high, and the length of the cave is 212 feet. The accompanying engraving shows the entrance.

Two ranges of basaltic rocks are supported on a lava-like mass beneath, and the unequal hardness of the materials combined with the perfection of the columnar structure, has permitted the carving out by the waves of the sea, of one of the most picturesque pieces of natural architecture in the world. These basalts belong to the miocene period.

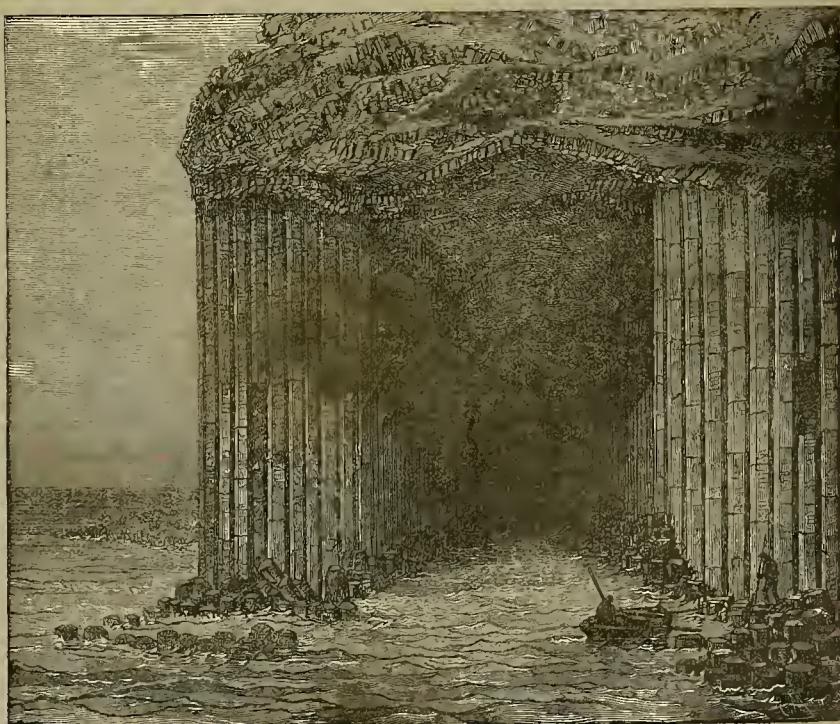
THE Spring Valley Mining and Irrigation Co. has been incorporated.



THE GARNIER ORE CONCENTRATOR.



SUE MINE, CALICO MINING DISTRICT.



CAVE FORMED IN COLUMNAR BASALT.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Blue Gravel in Siskiyou County.

EDITORS PRESS:—As there is quite an excitement in regard to blue gravel at present in mining circles, it may be of interest to the readers of your valuable and widely circulated paper to give a history of developments on the blue lead in Cottonwood and vicinity. I have advocated the theory for three years that there was a deposit of blue gravel extending north from Butte county through Tehama, Shasta, Trinity and Siskiyou counties, California; also extending into Jackson and Josephine counties, Oregon. This is supposed to be an ancient river traversing the country from north to south, but some of our scientific geologists claim it a lake deposit or chain of lakes. It is immaterial how it was formed as long as it proves rich in gold. The first discovery made of any importance was made about three years ago by C. B. Jilson, an old and successful blue-gravel miner of Sierra Co., Cal.

Mr. Jilson had been up to Portland and was on his way back, when he concluded to stop over and take a look at this old placer camp. After viewing the old diggings which were worked in early days, he concluded that there was an old river channel underlying the sandstone formation. He proceeded to examine it and see if the Klamath river cut it deep enough so it could be opened.

One and a half miles below the town of Henley, he found prospects and indications of blue gravel, that led him to think that he had found a second Bald mountain. After the usual vicissitudes incidental to a new departure of mining in this district, where the majority of the mining population ridiculed the idea of an old channel, Mr. Jilson, being a man of energy and determination, was sure he was right and went ahead. His son Oliver came up and they went to work running tunnels to determine the extent of the gravel and see if it would justify them in bringing water on the ground for hydraulic purposes. The prospects were flattering, and to-day (after expending \$25,000 on the property) it is demonstrated that they have one of the finest mining properties in the State. The company owns one and a half miles in length by 1500 feet in width, six miles of ditch, 2000 feet of pipe, 350 feet pressure, 150 feet dump. The claim is in fine shape, and if this winter is favorable, they will take out, at a low estimate, between \$30,000 and \$40,000. The beauty of their ground is they have a million and a half of square yards of paying gravel which will go 50 cents to the square yard. The drift proposition is immense, as it will take years to work it out. Messrs. Jilson & Son are practical and scientific miners, full of energy and staying qualities. Mr. Jilson's wife and daughter left a comfortable home to share the hardships of a miner's life. They were always cheerful and willing to lend a helping hand and give cheering words of hope when things looked darkest, and now they are reaping their just reward.

The Black Jack Co. joins Jilson & Co. on the north, owning 160 acres. The company are principally railroad men, not one of them having any practical knowledge of gravel mining. They commenced shortly after Jilson & Co., and are deserving of credit for their pluck and energy for having stayed with their mine through many difficulties. At present they are getting some fine prospects. Their claim is a drifting proposition (in fact all of the locations are with the exception of Jilson & Co.). They have run an incline shaft commencing on the west rim dipping at an angle of 30°.

The shaft is down 160 feet at present and still pitting. They had milling gravel all the way, having two different lots worked here by mill process. The gravel averaged \$3 per ton. Next spring the company intends putting in a plant at the mine, and properly worked it will pay a handsome profit.

The Nelson claim of 160 acres joins the Black Jack on the north; no developments.

The Tom Paine Co. (160 acres) joins the Nelson on the north; no developments.

The El Dorado Co., 160 acres, joins the Tom Paine on the north. This property is owned by Ashland, Oregon, parties. They have just completed a hole of 166 feet 6 inch diameter, going through sandstone, pipeclay and 13 feet of blue gravel, getting some fine prospects brought up by the sand pump. North of the El Dorado Co., Burkhalter, Green, Mellet and Horn have 80 acres; no developments yet.

Seven miles north is the Soda Bar claim, owned by Wm. Smith. He has got some good prospects but will require considerable work to develop the claim.

One mile north of Soda Bar, Henry and Campbell have claims located. They have a shaft down 80 feet, but the water got so strong they had to quit until they can raise capital to put in machinery.

Wm. H. Hampton and other parties of Portland, Oregon, have located claims east of Black Jack, Nelson and Tom Paine claims. Mr. Hampton, geologist, assayer, chemist and mining engineer, thinks this a lake deposit and therefore he is sanguine that it will pay very well; hence his location east. He is at present sinking a shaft and will continue it to bedrock.

South and just across the Klamath river Wilburn & Co. have several hundred acres

located. They have prospected on the river, have found blue gravel and got some prospects. South of Wilburn & Co. are several claims located; no developments yet. Green Horn Gulch Co. in the vicinity of Yreka have struck the same lead and it is paying handsomely. Thus with the opening of the new year everything looks bright for the future of blue gravel here.

Several years ago I mined in Butte county in the vicinity of Diamond City and Centerville, on Big Butte creek. There is the same deposit of sandstone, crystalline, conglomerate, and cemented blue gravel. After I came up here and saw the formation and the prospects at the Jilson claim, I became convinced it was the same. Future developments will prove whether I am right or not. R. A. G. Henley, Jan. 1.

Gold Mining in the Older States.

EDITORS PRESS:—The writer of the article entitled "Gold Mining in the Older States," published in your issue of December 13, 1890, is laboring under a serious mistake when he says that there is no gold here. The fact that there are not larger returns of gold from the States mentioned is due to our inability to economically extract it from the ores. There are hundreds of veins and mass deposits of ore from 3 feet to 300 feet in thickness, carrying from 4 per cent to 20 per cent of sulphurets that will average from \$20 to \$40 gold per ton of concentrates. These veins also carry from \$1 to \$3 per ton free gold. Many of these veins are mostly decomposed down to water-level, and nearly all of them have been worked to that depth. This work was mostly done by negroes before the war, but all work stopped when the free gold gave out. Since the war the gold-fields of the South have been invaded by an army of so-called "California experts," each one having a "dead sure" process for working our ores.

Large sums of money have indeed been invested by our Eastern capitalists upon the magnificent representations of these self-styled experts, and every dollar so invested has been hurried or expended by these charlatans in airing their pretensions. The people, however, soon became tired of this, and a California (I) expert of this class is now a *rara avis* in this section. Intelligent and conservative minds, however, took hold of the problem, and during the past year there has been in operation on one of our mines, yielding \$4 sulphurets ores (the concentrates running about \$23 gold), a process which nets the owners \$75,000 per year. The plant consists of a 40-stamp mill, concentrators and chlorinators. The concentrates are treated by chlorination for about \$3.50 per ton. This solves the problem of successfully working our low-grade ores, but we are still on the lookout for even better. If you know of anything better, your readers here will be pleased to hear from you.

Such authorities as Genth, Hunt, Emmons, Lieber and others who have made a special study of our ore deposits agree that we have an almost inexhaustible supply of the kind of ore I have referred to. A SUBSCRIBER. Kings Mountain, N. C.

The Accident at the Utica Mine.

EDITORS PRESS:—The Utica mine is operated by two shafts, and the north shaft was the scene of the recent accident. This shaft is of two compartments with manway at south end. The shaft from the 200-foot level to the bottom is partitioned. Twenty-five feet above the bottom of the sump, in the compartment that the ore skip travels in, a platform is built to catch any rock that might fall from the skip and prevent its falling into the sump. The shaft is 550 feet deep. The hoist is double, each cable running on a separate drum, while the ore and water is hoisted by self-dumping skips.

At noon on Monday, Jan. 5th, the ore skip was hoisted as usual with about a ton of ore, to equalize the weight of the water skip, and one skip load of miners brought to the surface. The skip was then lowered and brought to within 80 feet of the surface, when the cable parted on the drum. The skip with its load of miners dropped to the platform before referred to, struck the rock that had accumulated, and breaking loose from the guides, bounded through into the water-skip side of the shaft and dropped into the water in the sump, which at that time was about ten feet deep. The water rapidly accumulated, the ore skip preventing the lowering of the water skip to the bottom of the shaft.

A pump was hastily rigged and driven by compressed air. The water from the bottom of the shaft was raised to the 530-foot level and here held by a dam. A pipe from this reservoir conveyed the water to the skip, and it was then hoisted to the surface. By means of grappling irons, three men and the half of another victim were taken out. When the water was sufficiently lowered to get at the skip containing the dead miners, a chain was fastened to the haul, then attached to the bottom of the water skip and both skips hoisted to the surface, when the bodies of five and the remaining half of the body previously secured were found in the skip, making 9 (nine) miners killed.

The names of the unfortunates were:

Dan Danielson, married.
Brice Carter, married.
Thomas Kentzrich, married.
Wm. Case, married.
David McAnn, single.
Peter Tuship, single.
P. Cupich, single.
Sebastian Ferraso, single.
Jno. Demera, single.

The breaking cable was round, 1½ inches in diameter, steel wire, with a breaking strain of 42 tons and a working capacity of nine tons. At the time of the accident the cable was carrying:

The skip, about	Lbs. 800
One ton of ballast	2,000
Nine miners, about	1,700
Total	4,500

Or one-half of the working capacity of the cable.

The break occurred at a point on the cable where, the cable having filled the drum, starts back or laps over. Here the wires of the broken cable are somewhat worn on two of the strands; none of the wires are worn through and the wires in all the other strands are apparently as when new. The worn strands first broke square off and then the wires in the others frayed out and snapped off at irregular distances. This cable had been in use but eight months, while its companion, on the water skip, has been in use for 18 months and is to all appearance good as new. That part of the cable that had been worn off would not reduce the diameter of the cable to exceed an eighth of an inch, thus leaving one inch of rope, which to all appearance would have a carrying capacity and breaking strain within a fraction of as much as the cable's capacity when new. No one who is acquainted with the superintendent, Mr. C. D. Lane, and joint owner with Messrs. Hayward & Hobart in the Utica, will suggest that the cable was kept in use when known to be unsafe, or that the accident is due to a desire to economize and use the cable as long as possible. If Mr. Lane is at fault in his management, it is in his never counting the cost when the lives of the men or the success of the mine is at stake. An old and experienced miner himself, he enters into the fullest sympathy with those in his employ and is the friend and companion of every man under him. Notwithstanding the sad loss of life at the Utica mine, there has never been, and is not now, one miner on the Utica force that has any feeling other than the kindest for their whole-souled, kind-hearted superintendent, C. D. Lane.

E. H. SCHAEFFLE.

Murphys, Cal., Jan. 8, 1891

Mining in the Black Hills.

Everything now indicates that we are on the eve of a period of prosperity which must continue for many years. The success of the reduction works will be the cause of the building of many more like institutions. The success recently attained in reducing the dry ores of the Bald Mountain belt has given an impetus to prospecting enterprises and development work, which is rapidly trading up this belt and showing it to be much more extensive than heretofore supposed. On the north end of this belt the ore is found to dip toward the foothills under the limestone formation. To the west, on the divide between Squaw creek and Spearfish canyon, there has been but little prospecting done, owing to the fact that the deposit lies deeper there than in many other parts of the belt. Discoveries have been made, however, west of Spearfish canyon. On the northeast rich bodies of this ore have been found at the head of Blacktail creek and on the other side of the divide near Garden City, dipping toward the east. On the south this belt connects with the Galena district.

Observant readers of our mining reports will note a pleasantly monotonous uniformity in the grades of ore reported, ranging from \$10 to \$40 per ton. There are some who fear that these reports are written with a bias for working up a boom, which is a very natural conclusion after so many booms in different parts of the Black Hills have each terminated to be a boom-crashing reaction against the permanent interests of the country. We have aimed to have these statements moderate and under rather than over the facts. The truth is, the public is a little slow to realize the wonderful changes which the new order of things will bring.—Deadwood Pioneer.

NEVADA COUNTY RESOURCES.—The Nevada Transcript says: Nevada county is rich in undeveloped resources. The well-beaten paths of the mining prospector have covered a large part of the surface, but untold treasures of mineral wealth yet lie hidden in the bosom of the mountain and foothill chains. The production of fruit has added luster to the star that shines resplendent "amid the grand galaxy of twinkling emblems that adorn the blue field of our great American banner," but growers have scarcely begun to appreciate the possibilities that lie in this direction. The lumber industry has hardly been tapped as yet. An immense water-power is going to waste, that some day will be made to turn wheels of manufacturing establishments and furnish employment to thousands of workmen. Through continued agitation and the use of object-lessons, she will in the course of a few years receive large accessions of a desirable character to her population, whose presence will hasten the development of our vast and varied natural resources.

Selling Mines in New York.

A New York correspondent of the Union Democrat says:

When an old Californian who knows every inch of the dear old ground, who has mined in every district, fished in every mountain stream, shot over acres of marsh and upland, fished himself anchored here, with long scope and can't get the mud-hook up, strain as he may, it just makes his bowels yearn to pick up a California paper and read of big strikes and successful mining all over the country, and especially do the said howls rumble rebelliously when he thinks of old Tnolumne. To have to stay here and endure all this rattle, rushing, crowding and struggle, when visions of the successful and quiet life you fortunates enjoy far away from this wear and tear, is decidedly rough. A man who has never exchanged all that for this rattle and hang-on't appreciate his good fortune in being spared the infliction of "high civilization," which consists in being obliged to wear a stove-pipe hat, a high collar that saws his ears, and gloves—no soft hats and turn-down collar, and to admit that you smoke a pipe on the sly is a confession to cause a loss of caste.

Do you wonder that an old Californian retires into a dark corner and relieves his pent-up feelings by letting off a few cuss words? You would do it yourself. The time was when New York had a good deal of business with and faith in California. The daddies of the present generation shipped goods and invested in mines, but the present stock is lamentably ignorant of the geography and resources of California. They know nothing of it; all they know is Wall street. If you go to them about a mine, they hold up their hands in holy horror and begin to tell you of how much money their daddies lost in mines, but never mention how much they made on the yellow soap and pickles they shipped or how much they made out of some other mine. If a man loses a dollar in a mine it is the biggest dollar that ever was, and they never cease to squeal over it, but they go into Wall street and get cleaned out root and branch, but that is all right, whereas the chances in mines are ten to one over an investment in Wall street.

I have in my mind this moment two men to whom I presented a legitimate mining proposition and only asked them to put up a small installment on a working bond, but they couldn't think of such an investment—too much risk and uncertainty. They had their legitimate business and could not depart from it—the legitimate business being dealing in shares in Wall street. I said: "There are no panics in mining, 'tis a legitimate business, and the percentage of success is many degrees above even merchandizing and a hundred per cent over Wall street." They declared mining to be a fraud. I said: "Suppose that belief was universal and everybody quit it, where would you fellows get your money to gamble on? You don't want to do it, you want 'tother fellow to do it for you. Well, wait and see how you will come out on your theory when the next panic in Wall street knocks you sky high."

Sure enough, it was not many days before a panic did come, and it so happened these very two men got it heavy. One dropped an even \$400,000 and the other over a million. It was only a day or two since that I encountered one of them in an elevated car going home, and could not resist rubbing it in a little. I said: "How about legitimate business in Wall street versus mining?" He got up, parted his coat-tails, and said: "Just kick me, will you? Why in sheol didn't you make me put a little money into that scheme? Why, I have lost enough to buy half a dozen mines." "Oh yes, of course, but then that would not have been your idea of legitimate business; you certainly could not have lost your money more effectually."

No, it is of very little use to talk mines and mining to these pig-heads. They fall back on tradition of how much money somebody lost, and talk of the wads of worthless mining stocks they fell heir to from their daddies, but when you ask how about the cords and cords of worthless railroad shares and bonds they found in the tin box, they are mum. It is exasperating to try to talk to such narrow-minded, bigoted fools. New York is no market for mines. It matters little how good they may be, the prejudice is deep seated and it is labor lost to undertake to get a dollar toward this the best and safest business of the day. If one effort in ten succeeds that one success covers all the previous losses, probably, and puts the individual ahead.

We fellows who have been there know all this, but we waste our lives and time here in this kind of missionary work, and California miners must fall back on home capital and home enterprise. There is no help from this quarter. We have a country that is unrivaled, and a business far ahead of Wall street, so let us thank the Lord that we are not doomed to live always in this cold-blooded, bigoted country. You fellows especially who live in your pious little village should be thankful. You are free from panics, and a slump of ten per cent on railroad stocks don't keep you awake nights and walking the floor. All the Californians over this side are flat busted and trying to beg or borrow money enough to get back, and they don't have much success. Every fellow that has a dollar to lend, finds plenty of customers among his own friends.

The only salvation for the busted California community rests in the faint hope that the railroads will get by the ears again and put fares down to \$25, and it would be a strain to raise that. Your sympathies should go out, too, to us fellows who are waiting to get the money for what we have sold. To make a sale of anything is difficult enough; to get the money after you have sold, is a trial of patience and endurance. These people can owe you money and come nearer not paying it than any community that I ever met. They are a cheeky lot, you bet.

MINING PROSPECTS AT NEVADA CITY.—The mining prospects in the Nevada district are considered very promising at the present time, owing to the success attending the operations in the Champion, Mountaineer and several other quartz mines, and of the recent strike of pay gravel in the Harmony mine on the ridge north of Deer creek. This gravel is giving a profitable yield, and the channel is found to be several hundred feet in width, and as the company's location covers a mile in length on the channel, there is every probability that a large extent of pay ground will be opened up. The stock in this mine could have been bought a few months ago at 20 cents per share, but it cannot now be had at less than \$5 per share. The strike in the Harmony has stimulated to activity the owners of adjoining locations, and the Fountain Head Co., the first location east of the Harmony, is making preparations to commence early operations by putting down an incline to the gravel channel. Geo. G. Allan, proprietor of the Nevada Foundry, who has equipped many mines in the county, will furnish the machinery for this mine. It is expected that the present season will witness extensive prospecting along the same ridge, which will give more activity to the mining business than has been known in the district in many years.—*Grass Valley Union*.

SOUTH AFRICAN GOLD.—A South African dispatch says that there is an enormous increase in the output of gold at Johannesburg, and that the field there promises to be the richest in the world. The Mashonaland prospectors report that in that remote part of Africa, not recently almost unknown to Europeans, they have found evidence of former occupation by a large mining population, as shown by the remains of extensive alluvial workings and shafts and excavations for small, rich leads, the quartz from which has been ground on large slabs of granite. The round stones used as crushing rollers lie about in hundreds, partially hidden by accumulated soil and tropical undergrowth.

AMERICAN SHIPS STILL LEAD.—There is a store of comfort and hope for American builders and owners of wooden sailing vessels in the statement of the Hon. W. W. Pace, United States Commissioner of Navigation, who has made a study of the subject, that the average life of American-built wooden sailing vessels is 18½ years, while that of European-built iron sailing vessels is only 13 years. These figures are surprising, but they are vouched for as absolutely correct. The reason is that the care and fidelity with which American ships are built make them excel in almost every respect. He further states that American-built iron steamships last fully one-half longer than similar vessels of British build.

LOCAL COAL RECEIPTS.—Custom-house statistics show that during December 90,520,774 pounds of coal were brought to this city, a duty of 75 cents being levied on each ton. William Chipman, the chief weigher, states that there is a heavy pressure at present on his subordinates. The entire regular force is busy, and the 13 temporary assistant weighers have been actively employed for the last three weeks. Some of them have been compelled to work at night. The indications are that the import of coal for this month and February will be greater than in December.

LARGE SMELTING WORKS TO BE BUILT.—Washington, January 9th.—The Bureau of American Republics is informed that since the passage of the McKinley bill, which places a heavy duty on silver-bearing lead ores formerly brought from Mexico to the United States for reduction, a company has been established for the erection of large smelting works at San Luis Potosi, with a capital of \$4,000,000, furnished by a New York syndicate.

SMELTING IMPORTED METALS.—The Secretary of the Treasury has issued a series of regulations to carry into effect Section 24 of the Tariff Act, providing for the smelting and refining of imported metals in crude form in bonded warehouses. They provide generally that smelting and refining metals may be done in separate establishments under certain restrictions.

A MINING TRANSACTION.—James E. Boland has sued J. R. Norton, otherwise known as Santiago R. Norton, to recover \$7000 damages for failure on the part of defendant to carry out a certain contract relative to the development of the Bonanza mine in Arispe district, Sonora.

LYNN CREEK, ARIZONA.—Hydraulic miners are sending a great deal of worked-out gravel down the stream. Farmers are already talking of baving some of their land covered by silt.

The Governor and Hydraulic Mining.

Governor H. H. Markham, in his inaugural address to the Legislature, had the following to say concerning the hydraulic-mining interests of California:

One important branch of our industries, that of hydraulic mining, is at a standstill, and will never be revived unless vigorous steps be taken by the General Government.

Congress and the courts have placed the strong and powerful arm of the law upon this industry and crushed it out of existence. I need not repeat its history, for it is familiar to all of you and to the people of the State. No relief could be expected from the General Government were the workings of these mines beneficial to the interests of this State alone. It was from the goldfields of California, however, that the millions were taken that assisted this nation so materially in her greatest financial peril.

These same goldfields have yielded the enormous amount of nearly a billion and a half of the precious metal, thereby replenishing the Treasury of the United States with that needed medium of exchange. It is said that it will be difficult, if not impossible, to devise means whereby the gold can be extracted in paying quantities without harm to the farm-owners in the valleys or injury to the navigation of certain streams. If that be true, it should be avoided. But I have such confidence in the combined wisdom of 66,000,000 of people in this country that I feel safe in saying that if an earnest effort were made on the part of the General Government for that purpose, the result would be accompanied with profit to the whole country.

In my judgment, no industry would more richly repay a reasonable outlay on the part of the Government than this.

I suggest, therefore, that the subject be thoroughly agitated, Congress memorialized and our Senators and Representatives urged to take all necessary steps to bring the matter properly before Congress at the earliest moment possible. Congress properly expends thousands of dollars every year in experiments and investigations which in the opinion of its members will promote the public interests of the country. For instance, a special committee has been created on irrigation of arid lands, and a liberal appropriation is annually made for the purpose of studying the subject. The most thoroughly qualified men of the age are employed for this work, and all the means that science and skill can evolve are brought into requisition in solving the problems. Many other instances, familiar to all, of the liberal action of the Government could be cited. Why should not Congress treat this question in a similar manner, and assist in a solution of the difficulties surrounding the production of gold? It is a matter of national interest, for this metal is accepted by all men as a medium of exchange. Within the borders of California, millions upon millions of gold are locked up in the bowels of the earth, awaiting the genius of man to devise some feasible method of release, and I urge you to take the initiative in obtaining the assistance of the Federal Government.

PROPOSED MINING BUREAU.—For the promotion of mining matters in the Great Basin, says the Salt Lake Tribune, some gentlemen are talking of incorporating a Mining Bureau, to be made up of the solid men of this city and including others in Utah Territory and adjoining States. The capital will be large enough to handle good properties and for the development of prospects. The bureau is to have its own engineers and experts, and whenever a property is placed in their hands there will be thorough examination and reports. On such properties as are reported favorably the bureau will engage to raise funds and develop in the interest of investors. The promoters of this enterprise say that there is much money in the East which is awaiting investments in good enterprises, and if such a bureau as here named was established upon a solid basis and managed by judicious and well-known business men, this money could be diverted to this immediate country to help develop the many mineral lodes now lying dormant. They also say that such a bureau would be the means of putting a stop to the unloading of worthless claims or prospects upon a confiding public through misrepresentations. These gentlemen believe this plan will work good to this great mining country and greatly assist in making this industry more popular than it is now.

THE lobsters spoken of some time ago as being planted in the Sound have been heard from. The Kitsap Pioneer says: A former employee of the United States Fish Commission steamer, the Albatross, stated that he had recently found some of the lobsters in the Bay of Utsalady, across the Sound from where they were planted, and that he found them in several other places, showing that they are rapidly propagated. Several other persons have reported finding lobsters at various points on the Sound.

GOLD HILL MINES.—The Virginia (Nev.) Enterprise says: The promise of good result from the pumping operations in Gold Hill is really good. When deep mining was being carried on in that section, things looked bright. A drift was cut out from the 2200 level of the Crown Point toward the Exchequer line, and

the miners were drowned out by a flood of hot water as soon as they struck a strong body of pay ore, and before that they had already commenced to explore a very promising looking body of ore in the Bolshoi mine. This makes two bodies of ore in existence about which there is no question, excepting as to their extent. It is proposed by means of the present pumping operations to prospect the bodies of ore discovered so many years ago, and to this extent they are working for a certainty.

The Blue Lead in Siskiyou County.

The Yreka (Siskiyou county) Journal says: The interest manifested in the last few months in the "blue lead" which is supposed to run through this county from north to south, and which can be easily traced on the surface throughout the entire county, has induced investigation into the history of the several "dead river" channels which have been worked in this State. This investigation demonstrates that every one of these channels, wherever found, has been rich in gold. The dead rivers of California, so far as known, are on the western slope of the Sierra Nevada range, from 500 to 7000 feet above the level of the sea. The most notable of these was known as the Big Blue lead, which was traced and worked from Little Grizzly, in Sierra county, to Forest Hill, in Placer county, a distance of 65 miles. The elevation is 5000 feet above the level of the sea at Little Grizzly, and 2800 feet at Forest Hill. It is estimated by scientific men that this river was ten times as large as the present Sacramento. A great many million dollars were taken from the "Big Blue." A number of other channels have been worked out, and a number more are now being worked, all of which have been and are very rich. The usual location of these dead rivers is about 30 miles west of the Sierra Nevada and parallel therewith. Some of these channels run under high mountains, which are tunneled through. In other places they have been raised above their early locations, and are found, as above stated, at an elevation of 7000 feet above the sea.

There is no doubt, from all indications, that one of these dead rivers ran through what is now Siskiyou county—whether north or south is not yet known. It has been suggested by a celebrated writer that this might have been the Columbia river, and that it extended through the entire State, but as yet there is no positive evidence that such is the case. Wherever this channel has been reached in this county, it has been rich, as demonstrated at and in the vicinity of Cottonwood, and north of that place nearly to the Siskiyou, where Mr. W. H. Smith has found the channel and good prospects. What has been and is being done in Cottonwood mining district, we need not describe in this article, as our readers are well informed on that subject. Suffice it to say that mining men of experience and large capital are investing heavily in that section.

The probabilities that there is a dead river channel running within a mile of Yreka are so strong that a number of our citizens are making an organized effort to prospect it. These gentlemen have secured locations along the line of the channel for a distance of 2½ miles, and will proceed without unnecessary delay to give the matter a fair test. This, of course, will involve an outlay of some money, and, as is usually the case, the men who are moving in the matter are men of limited means, and will expect assistance from all who are interested in the development of Siskiyou county in general and Yreka in particular. A corporation, which will embrace in its business mining for gold and coal, will be formed, and all who are disposed to help in the enterprise will be given an opportunity to do so. We earnestly hope that our citizens will not be backward in this matter. All must realize that if there is a rich channel in this valley, its development will be of great importance to our business interests. If nothing is developed, no one will feel the loss of the little they subscribe to test it. It is anticipated that within a few weeks at the longest, boring with machinery will be commenced.

BULLION PRODUCT.—The detailed account of the bullion product of the Con. Cal. & Virginia mine for the month of December was as follows: Worked at the Eureka mill, 7040 tons of ore. Bullion produced—Gold, \$46,054.75; silver, \$53,977.12; total, \$100,031.87. Yield in bullion per ton—Gold, \$6.54.2; silver, \$7.66.7; total, \$14.20.9. Value of ore per ton as per battery assay, \$18.77.4. Additional bullion from assay office, Virginia City: From bar granulations, \$575.56; from fine dust, scraps, etc., \$2395.45; total, \$3471.01. Total value, \$103,502.88.

THE agitation in the matter of silver purchases and free coinage during the past 18 months has greatly stimulated the mining industry, and consequently good mining properties have been in good demand. While the price of silver has been subject to fluctuations, still the opinion is held by leading financiers that a free-coinage bill will eventually carry the day.

THE Paradise Valley M. & M. Co.'s property in Humboldt county, Nevada, has been sold at sheriff's sale for \$19,740.44 to W. J. Bell, who bid it in.

THE reduction works of the Eureka Con. M. Co. have been closed down until the spring.

The California Legislature of 1891.

Senate.

Dist.	Name and Party.	County.
1	F. McGowan, R.	Humboldt and Del Norte
2	R. H. Campbell, R.	Trinity, Siskiyou and Sbast
3	M. H. Mead, D.	Modoc, Lassen, Plumas and Sierra
4	C. L. Pond, R.	died Nov. 29, 1890.....Butte
5	E. M. Preston, R.	.....Nevada
6	J. H. Sewell, D.	.....Mendocino and Lake
7	Thos. Fraser, R.	.....Placer and El Dorado
8	H. C. Wilson, D.	.....Tebama and Colusa
9	F. S. Sprague, R.	.....Yolo and Napa
10	J. W. Ragsdale, R.	.....Sonoma
11	G. J. Campbell, R.	.....Solano
12	D. A. Ostrom, D.	.....Yuba and Sutter
13	F. R. Dray, R.	.....Sacramento
14	E. C. Voorhies, R.	.....Amador and Calaveras
15	F. C. De Long, R.	.....Marin and Contra Costa
16	Eli S. Dennis, R.	.....Alameda
17	W. E. Dargie, R.	.....Alameda
18	William Simpson, R.	.....Alameda
19	J. W. Welch, D.	.....San Francisco
20	George H. Williams, R.	.....San Francisco
21	W. O. Banks, R.	.....San Francisco
22	Daniel H. Everett, R.	.....San Francisco
23	W. H. Williams, D.	.....San Francisco
24	J. H. Mahoney, R.	.....San Francisco
25	James E. Britt, D.	.....San Francisco
26	John T. Broderick, R.	.....San Francisco
27	John E. Hamill, D.	.....San Francisco
28	Thos. C. Mahler, R.	.....San Francisco
29	B. F. Langford, D.	.....San Joaquin
30	T. D. Harp, D.	Merced, Stanislaus, Tuolumne
31	W. H. Randall, R.	.....Santa Clara
32	W. C. Bailey, R.	.....Santa Clara
33	J. D. Byrnes, R.	.....San Mateo, Santa Cruz
34	G. G. Goucher, D.	Mariposa, Alpine, Mono, Fresno
35	Thomas Flint, Jr., R.	Monterey, San Benito
36	G. S. Berry, D.	.....Inyo, Tulare, Kern
37	E. H. Heacock, R.	Santa Barbara, San Luis Obispo, Ventura
38	R. B. Carpenter, R.	.....Los Angeles, Orange
39	J. F. McComas, R.	.....Los Angeles
40	H. M. Streeter, R.	San Diego, San Bernardino

Assembly.

1	George B. Robertson, D.	Del Norte, Siskiyou
2	A. J. Eledore, R.	Humboldt
3	E. D. Kellogg, A.	Humboldt
4	T. W. H. Shannab, D.	Trinity, Sbast
5	J. T. Jones, R.	Modoc, Lassen
6	F. G. Hall, R.	Plumas, Sierra
7	James T. Motlock, R.	Tebama
8	T. H. Barnard, R.	Butte
9	J. J. Smith, R.	Butte
10	H. P. Eakle, D.	Colusa
11	George Sturtevant, R.	Mendocino
12	James H. Renfroe, D.	Lake
13	H. P. Siabler, D.	Sutter, Yuba
14	Michael Garver, D.	Nevada
15	Thos. Hocking, R.	Nevada
16	Dr. Noble Martin, R.	Placer
17	W. E. Baughman, R.	El Dorado
18	Jud. C. Brusie, R.	Sacramento
19	Elwood B.uner, R.	Sacramento
20	Gillis Doty, D.	Sacramento
21	Reese Clark, R.	Yolo
22	Frank L. Coombs, R.	Napa
23	Frank J. Murphy, R.	Sonoma
24	J. D. Barnett, R.	Sonoma
25	H. L. Weston, R.	Sonoma
26	Charles Duvner, R.	Solano
27	J. C. Wolfskill, D.	Marin, Solano
28	Thomas H. Estey, R.	Mario
29	James H. Daly, R.	San Francisco
30	Thomas J. Tully, R.	San Francisco
31	John Hays, R.	San Francisco
32	George E. Lewis, R.	San Francisco
33	F. L. Jones, R.	Sao Francisco
34	A. L. Lux, R.	San Francisco
35	William J. Dunn, D.	San Francisco
36	John P. Glynn, R.	San Francisco
37	M. W. Coffee, R.	San Francisco
38	A. T. Barnett, R.	San Francisco
39	Charles S. Arms, D.	San Francisco
40	Thomas W. Dennis, R.	San Francisco
41	H. C. Dibble, R.	San Francisco
42	Louis A. Phillips, R.	San Francisco
43	William C. Tennis, R.	San Francisco
44	George A. Wentworth, R.	San Francisco
45	Eugene F. Bert, R.	San Francisco
46	Lawrence Hoey, R.	San Francisco
47	John T. Steltz, R.	San Francisco
48	J. Windrow, R.	San Francisco
49	Alexander Gordon, R.	San Mateo
50	W. H. Galbraith, R.	Santa Cruz
51	Frank L. Fowler, R.	Alameda
52	Fred Bryant, R.	Alameda
53	J. G. McCall, R.	Alameda
54	E. S. Culver, R.	Alameda
55	E. G. Cram, R.	Alameda
56	A. Ames, R.	Alameda
57	G. E. Carter, R.	Contra Costa
58	R. S. Johnson, R.	San Joaquin
59	J. L. Beecher, Jr., R.	San Joaquin
60	E. A. Freeman, R.	Amador
61	Alex. Brown, R.	Calaveras
62	Frank T. Murray, D.	Tuolumne
63	E. E. Dow, R.	Santa Clara
64	J. R. Low, R.	Santa Clara
65	George E. Hersey, R.	Santa Clara
66	J. S. Alexander, R.	Stanislaus
67	T. H. Gould, D.	Merced and Mariposa
68	C. G. Cargill, R.	San Benito
69	C. F. Lacey, R.	Monterey
70	B. R. Woodworth, R.	Fresno
71	W. S. Cunningham, D.	Tulare
72	F. E. Hunewell, R.	Alpine, Mono and Inyo
73	Marcus Harloe, R.	San Luis Obispo
74	W. A. Hawley, R.	Santa Barbara
75	T. H. Rice, D.	Kern and Ventura
76	F. N. Marion, R.	Los Angeles
77	J. R. Matthews, D.	Los Angeles
78	Gay A. Smith, R.	Los Angeles and Orange
79	John C. Lynch, R.	San Bernardino
80	N. A. Young, R.	Sao Diego

Senate.

Republicans, 27; Democrats, 12; vacant, 1.

Assembly.

Republicans, 63; Democrats, 16; American, 1.

Totals.

Republicans, 90; Democrats, 28; American, 1; vacant, on account of death, 1.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

THE KENNEDY MINE.—*Dispatch*, Jan. 10: We understand that the last month's cleanup at the Kennedy mine amounted to over \$27,000, which was an increase of about \$2000 over the previous month's run.

SUTTER CREEK.—*Amador Ledger*, Jan. 10: There are no new developments to report in the mining situation. At the North Star a body of water has been encountered within the last two weeks, which is considered by mining men an excellent sign. Drifting at the Rose mine continues in a southeasterly direction, with nothing new to report. A slight change has taken place in the management of the Lincoln mine. Mrs. Stewart has leased the property to the employees, which relieves her of all care and anxiety. The men feel confident of being able to make it pay. The Wildman is keeping up its reputation as one of the best properties in the county. The 30 stamps are kept running steadily. The ledge is very wide, and nearly all pay rock. The ore seems to improve with depth, and no doubt in the near future a new shaft will be sunk. At the North Star, crosscutting is still going on, and they only lack about 40 feet going southeast to reach the point where the rich ore was struck in the level above. Crosscutting is still in progress at the Rose mine, and there is sufficient encouragement to induce them to continue. The Lincoln mine is running along steadily, with Charles Smith in charge of the mill and Steve Moyle foreman at the mine. The Sutter mine is taking a temporary rest. Again the Mahoney is to be started ere long, according to Dame Rumor. Mr. Valentine is making arrangements for the construction of a large pipe to connect the Amador canal and the mill, the iron for which is said to be on the way.

Calaveras.

RICH GRAVEL.—*Calaveras Chronicle*, Jan. 10: Dave Lamson, of Railroad Flat, one of the owners of the Lava Bed Gravel Mine, showed us nine ounces of gold, the yield for two men's work for fifty days. The gold is what would be called by miners "coarse." The only water with which the gravel was washed was that pumped into a large tank from the mine. The gravel was put through three or four sluice-boxes, the operation continuing until the tank was emptied, then suspended until the tank was refilled. The working shaft is about one hundred feet in depth. No "breasting" has yet been done. The mine is one of the most promising gravel mining properties in the State. When the mine is fully opened, suitable milling machinery will be put up and the mine worked on a big scale, **Inyo.**

THE CAMPS.—*Inyo Independent*, Jan. 9: Mining business in the county is not very lively at present, but this is usual every winter. The Newtown mine at Cerro Gordo is turning out a good deal of ore; prospecting goes on in the Union, but no rich strikes are yet reported. Very little is doing in the Darwin district; Mr. McKenzie has a small force at work in the Lucky Jim but is not taking out much ore. Shipments continue to be made from the Defiance and about 15 men are working there. Regular shipments are made from Modoc, most of the ore at present being taken from the dumps. Mr. Fitzgerald has about a dozen men at work in the mine. It is reported that Mr. J. J. Gunn has recently struck a good prospect in the Minnietta. Pat Key is doing first rate at the White Hill and has two carloads of fine ore ready for shipment.

LEE DISTRICT has been regarded as one of the most promising mining regions in the county. It is somewhat isolated, however, and this has retarded development. For some weeks past Mr. S. W. Buck of Keeler has been doing some prospecting there, and recently some rich ore was struck. A sample lot was sent to Mr. James A. McKenzie of Darwin for assay, and he gave the following as the result, 1068.47 ounces of silver per ton. All Inyo miners know how thoroughly reliable an assayer Mr. McKenzie is. Mr. Buck says he has five tons of ore similar to assay sample ready for shipment. The mine is called the True Blue, and was first located by Charles E. McElvay several years ago. Very little work had been done upon the mine before Mr. Buck began operations.

Mariposa.

STRIKE NEAR COULTERVILLE.—*Mariposa Gazette*, Jan. 10: A strike has been made in the Black Bart mine. The mine is situated in an easterly direction from Coulterville, and what is known as Lovely Roger's gulch. Work was begun by the present ownership in April, 1890, and the indications for good rock were most favorable from the start. Other parties had heretofore prospected it without any marked success. Since their beginning, and up to the present strike, the mine had produced something like \$3000. In or about December last, the mine had been sunk to the footwall and the new vein was struck much richer than that which they had been working up to this date. The last strike was made on the footwall covering the bottom of the seven-foot shaft. When first opened up, the gold was found in a formation of porphyry and iron, and then running into white talc; the gold finally going directly to the footwall. The result of the find, so far, foots up about \$10,000; the sum was taken from 1,400 pounds of rock. This makes the output of the mine by the present owners figure up to some \$13,000. The good rock continues, and the indications are favorable for a much larger yield in the immediate future.

MILL BUSY.—Some good rock is now being taken from the No. 9 mine. The mill is kept busy and it may be that mining in that locality may again revive.

CRUSHING.—Henry Boisse is said to be crushing some very rich rock taken from his mine, near the Black Bart. Having no mill of his own, he packed his ore on burros over a trail to the Bruschi mill, nearly five miles distant.

Nevada.

A VALUABLE MINE.—*Transcript*, Jan. 7: Oscar Newhouse, the owner of the Diamond D (Eagle Bird) mine, has taken up his residence at the mine, which will, in the future, be worked under his personal supervision. The property has developed wonderfully under the management of Mr. New-

house, as it is said that there is now in sight enough ore to keep the 30-stamp mill running for the next ten years. In the spring more stamps will be put in, and the mine will then be in a position to pay a steady dividend on a valuation of \$2,000,000. The best of it is, the same property was offered in London some years ago, and refused, the imported expert, as usual, seeing nothing in it. The property is not now for sale.

REDUCTION WORKS AT NEVADA CITY.—*Grass Valley Union*, Jan. 7: Reduction works are to be established at Nevada City by a San Francisco company for treating refractory gold and silver ores by what is known as the lead-bath smelting process. The foundry building near the narrow-gauge railroad depot has been leased in which to place the machinery. The capacity of the works will be 24 tons a day.

THE HARMONY.—*Nevada Transcript*, Jan. 13: A partial cleanup made Sunday at the Harmony mine gave \$700 for the gravel taken out in six days with four picks. Some of the gold was coarse. Everything is working nicely. Twenty-four men are employed by the company and the monthly running expenses approximate \$2000. The mine is a little more than paying its way at present, although the only income is from the gravel taken out in running ditches. When the channel has been prospected and breasting begins there will be fifty or more men at work. The Harmony gives every indication of being largely remunerative for years to come.

CONSOLIDATING TWO PROPERTIES.—It is announced that W. W. Stow has purchased from the owner who now resides in Virginia City the Walcott gravel claim, adjoining the West Harmony, which is owned by Messrs. Walrath and Isard, and that the two properties will be consolidated and worked as one. Mr. Stow is said to have paid Walcott \$6500 for the ground.

COLD WEATHER AND MINING.—*Grass Valley Union*, Jan. 13: The freezing weather that has prevailed for some days past has had the effect of lessening the water supply of the ditches, and on Saturday the mining companies of this district were all compelled to suspend milling operations and economize their water power for the purpose of using it for pumping and hoisting, and some of them have found it necessary to start up their steam machinery as a supplementary power to do this work. The main trouble in regard to the water is on the upper portion of the South Yuba Canal, where there has been severe freezing weather, which has frozen water in the bottom of the canal, making anchor ice, and in consequence the flow of water has been lessened daily, which has prevented the supplying of the mining reservoirs with the usual amount, and some of the mines have been entirely deprived of water. Within the last forty-eight hours the weather has moderated somewhat, and it is likely that within the next two or three days the usual quantity of water will be available, and that all the stamps of the district will again commence dropping.

San Diego.

OWENS.—*Julian Sentinel*, Jan. 9: Work on the Owens mine is steadily progressing. The 300-gallon bucket is working splendidly, and the water is down to the 200-foot level. The shaft is 340 feet deep, and it is calculated that it will take about two weeks to get all the water out.

Shasta.

RICH STRIKE.—*Redding Free Press*, Jan. 10: Mr. Connor of the Skyblue mine informs us that a miner, recently from Nevada State, named J. Nugent, has opened up a rich prospect on Rock creek. He has a tunnel 62 feet long, and a ledge that he has traced 700 feet, which, being prospected, shows rich rock along its length. The ledge was capped over by an iron deposit, but underneath shows up well. All the ore taken out so far is good milling, and some of it is so rich that good wages can be made with a band mortar. Mr. Nugent was "put on" to this deposit by Mr. Connor, and is well pleased with his prospects. He is a miner of experience and knows a good thing when he sees it.

Siskiyou.

QUARTZ.—*Yreka Journal*, Jan. 7: Myron Carrick and Archie Nichols continue to find very rich specimens in their quartz ledge at Spring Gulch on Yreka Flats, northwest of Yreka, with the ledge about a foot thick in the bottom of their prospecting shaft. The specimens shown us contained about as much gold as quartz, which they crush in a hand mortar, realizing considerable money for current expenses.

BLUE GRAVEL.—The Lee, Lash & Co. blue gravel claim at Greenhorn, about a mile south of Yreka, is now being fixed up in good condition for more advantageous working. Owing to the bedrock pitching, it is necessary to cut a drain to the pump shaft, upon the completion of which a large force of men can be put at work in drifting blue gravel for raising to the surface by the steam hoisting apparatus now in position. The men at work on the drain have found several rich prospects in the black rock or cement covering the blue gravel deposit, indicating that this formation may be lava run over the bed of a stream from volcanic eruption in prehistoric ages. Prospecting for blue gravel seems to be all the rage just now in mining and efforts will be made to commence boring with machinery in this vicinity and throughout the entire watershed of the Klamath river south of Siskiyou mountain, also of Rogue river in Oregon and the streams running westward into Del Norte and Curry counties on each side of the California and Oregon boundary line. A test of this kind may prove that the bedrock in Yreka basin covers blue gravel containing gold, as Yreka Flats was the richest mining district on the coast in the first half of the '50 period, and the main attraction for inducing immigration to this county, the population of Yreka City at that time being fully 5000, with very few women and children. The Boyle quartz mine at head of Humboldt has been shut down for the winter in consequence of the snow and cold weather, but in the spring a large force will be set at work. The force at the Spencer mine, lower down, has also been reduced until spring, when a large force will be employed. Work on other quartz claims and placer diggings along Humboldt has also been suspended to a great extent. This district, when spring opens, will be one of the liveliest mining camps in the State, furnishing more employment for miners than any other district in the county.

Trinity.

CANYON CREEK.—*Trinity Journal*, Jan. 10: This week we paid a flying visit to Canyon creek and

found about a foot of snow on the locations of the Fisher Gulch Co. The mill was not running, as the snow and cold weather had shortened the water supply. Last week advantage was taken of the little water running to start up the mill and crush a few tons of ore. The mill worked well and the amalgam showed the rock to be of good grade. The ore-bin is full of ore and there are about 100 tons of good ore on the dump. The lower tunnel is being continued and the indications point to cutting the ledge in a few feet more. As soon as water starts up, work will be actively pushed on this property, and, from all appearances, with good returns. Development work is being carried on in the Bailey group of mines and the property is looking well. All indications point to the development of one of the biggest mines of the coast. Grigsby & Shattuck are running the mill on the Buck's Ranch mine, taking out ore and pushing things generally. The company have already made one cleanup that was entirely satisfactory. They are opening up a fine property.

NEVADA.

Washoe District.

CON. CAL. & VA.—*Virginia Chronicle*, Jan. 10: 1200 level: Continue to extract some milling ore from above the line of drift running south of the east crosscut No. 1 from the south drift from the shaft station. 1300: Continue to extract some ore from the point where the upraise carried up from the end of the east crosscut from the south drift connected with the fourth floor stopes. 1500 level: From the drift run north from the drift run west from the upraise carried up from the north lateral drift (43 feet above the sill floor of this level) at a point 20 feet in the drift, an upraise has been carried up 30 feet, and at this height we find some ore of about the average grade of our extraction. 1600: Continue to take out some ore along and above the line of the drift run east through the old stopes on the sill floor of this level; also from the stopes which we are working southerly from that drift. At a point 200 feet south from the north line of the California ground we have been working upward through the old stopes for the last two months. At a point 44 feet above the sill floor of this level a south drift has been advanced 24 feet, and from this south drift a west drift has been advanced 15 feet. The top portions, say two-thirds of the whole drifts, are in ore of good quality. The bottom portions are in ore of poor quality. Taken as a whole, the ore showing in these two drifts gives an average assay value of \$30 per ton. 165: Usual quantity of ore extracted from the various openings on this level. There has been extracted from all parts of the mine during the week 1620 tons of ore which was shipped to the Eureka mill. The average assay value of all of the ore worked at that mill during the week (1620 tons) was \$18.50 per ton. Bullion shipped to Carson Mint, assay value \$36,411.25. Bullion shipped to the office in San Francisco, assay value \$3471.01.

OPHIR.—The drift started north from the drift run west from the winze 122 feet below the sill floor of the 1300 level has been extended 26 feet; total 24 feet; continuing in quartz of very low assay value. No ore has been extracted during the week.

MEXICAN.—East crosscut No. 1, 1465 level, started from the main north lateral drift at a point opposite the west crosscut No. 1 has been extended 33 feet; total 265 feet; continuing in a porphyry formation which has become somewhat solter.

UNION CON.—East crosscut No. 2, 1465 level, started from the north lateral drift at a point 200 feet north from the south boundary line of the mine, has been extended 29 feet; total 213 feet; continuing in porphyry which carries some clay and some quartz.

SIERRA NEVADA.—Northwest drift from the shaft station, 630 level, has been extended 55 feet; total 284 feet; continuing in porphyry formation without any change.

BEST & BELCHER.—800 foot level: West crosscut No. 2 has been extended 12 feet; total, 408 feet. Formation porphyry and quartz. 1200 level: At a point in upraise No. 1, 100 feet above this level started a west crosscut No. 1 and extended it 14 feet; total, 39 feet. Formation hard porphyry.

BELCHER.—West crosscut No. 1 from the shaft is out 491 feet, having been advanced 80 feet during the week; face in soft porphyry and streaks of quartz, with some water running from it. Are mining from the fifth floor of the old 1300 raise and are finding some streaks of fair grade ore.

KENTUCK.—Finished grading on 1000 level and resumed work in face of east crosscut, same level. Face in porphyry and streaks of quartz.

YELLOW JACKET.—Are shipping daily 60 tons of ore, battery assay, \$18.18 per ton, and doing extensive prospecting work.

JUSTICE.—The north drift, 822 level, is out 189 feet; face in hard rock. The 492 level south winze is down 33 feet. The bottom is in fair grade ore. Shipped to the mill during the week 194 tons of \$16.59 rock, as per battery samples.

UTAH.—Northwest lateral drift from the shaft, 725 level, has been extended 54 feet; total length, 234 feet. Face in porphyry and clay.

SAVAGE.—During the week we have hoisted 739 cars of ore from the 300, 400, 500, 600, 750 and 1300 levels, and from the winze below 1300 level. Shipped to the Mexican mill 535½ tons of ore; ore milled, 545 tons; average battery assays, \$16 a ton. The winze station in the ore body from the track floor, 1300 level, is down 35 feet and continues in ore of good quality.

HALE & NORCROSS.—On the 1100 the north drift was advanced 240 feet, and has reached north boundary line. This drift followed the west boundary of the vein. We will start crosscutting east from the face of this drift the coming week. The north-east crosscut on this level was advanced a total distance of 228 feet; face of this crosscut has reached the east clay wall of the vein.

CHOLLAR.—On the 750 level are sinking a winze 100 feet south of north line to connect with 850 level. It is down 6 feet in quartz assaying from \$20 to \$30 per ton. Extracted and sent to the mill during the week 541 tons of ore, the average battery assay of which was \$21.40 per ton.

POTOTS.—The south lateral drift from the Chollar incline on the 1230 level is out 605 feet. In the face there is a streak of quartz 3½ feet wide assaying from \$12 to \$25. The south lateral drift from the Chollar incline, 1300 level, is out 180 feet; face in porphyry.

CON. NEW YORK.—The north drift on the 650 level is in 145 feet; face in porphyry. East crosscut

150 feet north of shaft, 1100 level, is in 61 feet; face in quartz and porphyry.

SILVER HILL.—Northeast drift from the winze on 160 level is out 570 feet; face in porphyry. Northwest drift, 334 level, is out from shaft 780 feet; face in hard porphyry.

EXCHEQUER.—The east crosscut 150 feet south of north line, 500 level, is out 380 feet; face in clay and porphyry. East crosscut near the south line, 600 level, is out 227 feet; formation porphyry and clay.

ALPHA.—The east crosscut, 70 feet north of shaft, 600 level, is out 260 feet. Face in clay and porphyry.

GOULD & CURRY.—200 level: Northwest drift is out 175 feet. It has been stopped and at a point 70 feet northwest of crosscut No. 2 we started to put in square sets in the old fill, with the idea of raising through them. In cutting out for sills some new ground was encountered, showing some spots of ore. For last week extracted 20 tons of ore of fair quality.

OVERMAN.—Extracted 425 tons and 1200 pounds of ore. Shipped to the Brunswick mill 433 tons and 1640 pounds of ore. Upraise from northwest drift on the 1100 level has been extended 86 feet and timbered. Have nine feet of ore in the face. On 1000 level southwest drift has been extended 88 feet; formation, porphyry with seams of clay.

ALTA.—Mine and mill closed down. Only watchmen employed and over 50 men thrown out of employment.

CROWN POINT.—Are extracting from the 1800 stopes from 8 to 10 tons of ore per day that assays from \$18 to \$20 per ton and storing it in the dump.

ANDES.—During the past week north drift, 420 level, was advanced 15 feet through a formation of porphyry, quartz and clay.

CONFIDENCE AND CHALLENGE.—The joint Confidence and Challenge north drift on the 300-foot level is now in 146 feet, six feet having been made during the week. The face still shows two feet of fair ore. The drift is now 10 feet in Confidence ground.

CON. IMPERIAL.—Considerable work is being done on the upper levels in following up and taking out small streaks of ore and overhauling the old stopes.

SEG. BELCHER.—The south drift from Belcher shaft, 600 level, is now out 44 feet in Seg. Belcher ground. Face in soft porphyry.

Tuscarora District.

DEL MONTE.—*Times-Review*, Jan. 9: North drift, first level, has been extended 14 feet without material change.

NEVADA QUEEN.—East drift on fourth level of Commonwealth will prospect the vein close to the line.

NAVAJO.—The stope below the 350-foot level is getting deeper going north. The ore continues high grade. Have broken about three tons of first-class ore showing considerable native silver.

BELLE ISLE.—The stope on the 350-foot level continue to look very well. The grade of the ore is improving. Sent to mill 40 tons of ore; battery assay value \$375.70 per ton. West crosscut from the 450-foot level extended 27 feet; water flow is diminishing. Have started a joint-line crosscut to the east, same level, progress 11 feet.

NORTH BELLE ISLE.—The 500 stopes are without material change. South intermediate line from No. 4 chute extended south six feet; still showing good ore in the face. An upraise from the 500 has been started opposite the vertical winze to give access to the stopes which have extended south beyond that point. Sent to mill 20 tons of ore; assay value \$14.6 per ton. Hoisted 129 cars of concentrating ore; estimated assay value \$76 per ton. Concentrator crushed 366 tons; estimated assay value, \$14.54 per ton.

COMMONWEALTH.—Fourth level: Have started joint crosscut at North Commonwealth line opposite joint raise, which has reached the hanging-wall, exposing some good ore. East crosscut extended 30 feet; rock hard; slight flow of water.

NORTH COMMONWEALTH.—Fourth level: Joint raise has reached the hanging-wall, passing through seams of good ore. Work suspended at this point and joint crosscut started to cut the vein on the level. West crosscut from No. 1 south drift, second level, advanced 30 feet, cutting strata of fair-grade ore. Intermediate drift extended south, opening up good ore. Hoisted 63 cars of concentrating ore. The different parts of the mine have all been caught up and is now in good condition.

ARIZONA.

ORE MARKET.—Mohave *Miner*, Jan. 10: In regard to the ore market for the ensuing year, the *Miner* sent out inquiries to different sampling works, and their replies show that to all appearances prices and sampling charges will be considerably higher than the past year, and especially so on extremely high-grade dry ores. Indications show that instead of paying 95 per cent of the silver value as heretofore, the smelters will only pay from 90 to 93 per cent, according to grade and character. Smelting charges are apt to range higher, from \$2 to \$5 per ton on lead as well as dry ores, excepting that ores would get so scarce that the smelters would be compelled to pay better prices in order to run their furnaces. The treatment on ores now is unreasonably high, and will no doubt be reduced as soon as the money market is somewhat relieved.

FLORES.—John H. Campbell, Superintendent of the Flores mine, intends to commence the erection of a ten-stamp mill on that property as soon as the machinery can be got on the ground. The mine has been opened up in good shape and large quantities of high-grade ore have been extracted. The ore body opened up in the south drift is six feet in width and averages between \$60 and \$70 per ton. To Mr. Campbell's energy and ability is due the present satisfactory condition of this mine.

NOTES.—*Prescott Courier*, Jan. 9: John Hartin has been doing some work on a ledge near the Iron Spring house, a short distance west of Prescott, and thinks said ledge worthy his consideration. The rock is gold bearing. The road crosses the ledge near D. Walker's place. It is large and well supplied with gold. Charley Rose is working in a ledge east of the Peck which is rich in silver. He found float and croppings in the bed of the creek which runs east from Bradshaw Basin. He is going to ship several tons of it. Frank Alters has been looking at the Yarnell lode, near Peeples Valley. He says it is one of the largest ledges he ever laid eyes on. The vein matter is spar, streaks of decomposed

iron in it carrying much gold. It is thought that the entire body of ore will yield from \$10 to \$14 per ton. The Fortuna mine, near Walnut Grove, is yielding silver nuggets. Barlegh drills will, we are told, soon be set at work at the Senator. Messrs. Brown and Cochrane are examining properties in the Bradshaws. Lester Jackson, who has just made a tour of Bradshaw, says they are taking gold rock from the Crowned King that will work \$500 a ton. The vein is opened in good shape. Miners of Tip Top district are increasing their shipments of ore to El Paso. The Congress continues to ship large quantities of concentrates and high-grade sulphur. S. C. Mott's workmen were hoisting good ore out of the Prince, which will soon be worked at the Tuscumbia mill. A great many men are working in the Boggs mine, Big Bug district. A. G. Dillon came here recently from Hillside district. He left the "boys" taking out shipping ore. Wm. A. Linn, who went to Cherry district to locate claims, found the miners well satisfied. Some of them are working ores in arastras. Lynx Creek hydraulic miners are said to be taking out plenty of gold. The diggings are eight miles east of Prescott.

SMELTER WANTED.—*Phoenix Herald*, Jan. 8: The necessity of a smelting plant near this city has long been apparent to the close observer of our mining affairs, and to-day that necessity is becoming imperative. A gentleman visiting Phoenix a day or two ago, superintendent of a large and rich mine in the Bradshaw country, made the statement that he could furnish ten carloads of ore daily for such a plant, and his is but one of the important mines in that region of country that would turn out five to ten carloads per day for many years to come. We have the lead ore, the lime and everything necessary to the successful working of a smelter plant at hand, and hundreds of thousands of tons of ore now on the dump that cannot be shipped out of the country to be worked, are waiting the coming of a smelter near enough to them to save part of their value to the miner.

BRITISH COLUMBIA.

HOT SPRINGS DISTRICT.—*Nelson Miner*, Jan. 3: A shaft has been started on W. W. Sprague's Tenderfoot, and 2 shifts are engaged in the work of sinking. Work will be resumed on the Old Timer the coming week. The tunnel on the Early Bird is in 30 feet, in ore all the way. This claim is situated close to the lake shore about a mile above Ainsworth, the ledge showing 4 feet of solid mineral. An ore-shed has been built near the mouth of the tunnel, where the first-class ore will be dumped so as to be handy for shipment to the Revelstoke smelter in the spring. Good progress is being made in sinking the Skyline working shaft. A. A. McKinnon is doing some development work on the Crystal. A new location called the Devil's Cash has been recorded by E. A. Bielenberg. It is on Woodbury creek.

COLORADO.

THE LAST DOLLAR.—*Aspen Times*, Jan. 10: The Last Dollar in Tourtelotte Park is one of the mines of this district of which the public hears very little. When Sam Bigelow staked it he named it the Last Dollar, simply because he had expended his last dollar for grub and the last of the grub had been exhausted. The main working incline has been sunk to the fifth level below the old level connecting with the bottom of the Justice shaft, and it has shown ore nearly all the way down. At places the contact has been lean, but there is a very good showing in the bottom and it looks as though the ore chute might be as large there as it is above. This incline can be driven nearly 1000 feet in Last Dollar ground, and the possibilities of development are beyond computation. The ore body that the leasers opened while working from the old shaft through the tortuous workings, has proved to be of enormous size. The leasers run into it but never had any idea how large it was. Since the shaft was sunk deeper and the new plan of development carried out, this ore body has been opened to a height of nearly 70 feet. There proved to be practically no banging-wall, only ribs of lime separating the strata of ore. The grade of the pay mineral is universally good, although there are immense quantities of ore that will not now pay but that will eventually become marketable. The mine is said to have a capacity of 300 tons of ore per day that will run from 12 to 20 ounces. The wall rock in every direction runs well, and when this is mined the stopes will be great caverns. The ore now produced carries from 50 to 80 ounces silver, and much of it is heavy in lead. Mr. Brown has the south end of the property leased and is shipping considerable ore from it that runs 60 ounces.

SILVER STRIKES.—*Denver Republican*, Jan. 3: Some very rich strikes have been made in Carpenter district of late which are attracting considerable attention and causing quite an influx of miners and prospectors to that section. Carpenter district is situated on the west side of the Black range, eight miles from Kingston. A majority of the producing mines in the Hennon district are now in the hands of companies and are being worked vigorously and with paying results. Considerable stimulus has been given to mining operations in Apache district, of which the town of Chloride is the center, by some rich strikes of late both in gold and silver. Formerly the mines were worked quite successfully, but owing to the long distance to haul the ores to the railroad, operations at one time were almost at a standstill. These late discoveries of pay ore in large quantities, together with a new concentrator in course of construction, will give that camp new life and energy. The Garfield mine here is taking out some of the richest ore in the district. The mine is under lease to George Robier and Stephen Marcy, who have now in sight and on the dumps 3 carloads of ore, which they will soon ship to Pueblo. The ore runs up in the hundreds in gold, besides silver and copper to more than pay the expenses of transportation and reduction. The Richmond Gold Mining Company has the machinery for its new mill here on the ground, the sheds and buildings almost completed, and by the 15th of January will have their new plant in operation. They will treat their own ore, mainly from the Mamie Richmond mine, and afterward buy ore to keep the mill running.

LEADVILLE.—*Georgetown Courier*, Jan. 10: The production of the Leadville mines during the past year was a little over \$11,000,000. In 1889 the production was over \$13,000,000. The body of ore

opened up in the Comet over which there was so much excitement some time ago has opened up as large as ever. The ore is being piled up awaiting favorable silver legislation.

MINERAL.—A remarkable piece of mineral was blasted from the footwall of the famous Lamartine mine a few days ago. The dimensions of the piece are 7x11x4 feet. Its weight is about twenty tons, and its value not less than \$4000. The block is composed entirely of solid mineral, and if it could be brought out whole would be one of the finest mineral specimens extant.

THE TUNNEL of the Berthoud Pass Canal Company will be in the neighborhood of a mile in length, and 600 feet below the summit of the pass. The tunnel will be 6½ feet in height, the Pacific end ten feet wide and the Atlantic end 6 feet. One hundred feet of the eastern end is completed, and work is progressing with a single shift per day. It is not expected that it will be completed before the summer of 1892.

DAKOTA.

SEABURY.—*Deadwood Pioneer*, Jan. 10: No men are working on the Seabury just at present, the force having been taken off some time ago. When work was stopped, a large body of low-grade ore was in sight, but it was deemed advisable to shut down until some means of reducing it were in operation. When the Iron Hill smelter starts up again, the Seabury will furnish plenty of ore to run it.

RICHMOND.—*Machinists*, under direction of Supt. Havens, are overhauling the Richmond mill, with a view to starting it up in the spring. This will greatly benefit Galena, as there is a large amount of milling ore on the dumps there, that is too low grade to pay the expenses of shipping and smelting.

COLUMBIA.—A small force is working on the Columbia location, which is situated near the town of Carbonate. Indications on the ground are favorable, although no ore has been found.

NORTHWESTERN.—Some parties have relocated the famous Northwestern Co.'s ground, within the town limits of Carbonate, and are doing work on it. **THE FIRST ORE.**—*Deadwood Pioneer*, Jan. 9: The first ore shipment out of Deadwood by way of the railroad was a car of Cora ore, and was sent out by S. C. Fargo & Son. The ore was hauled by wagon from Galena, and averaged over \$300 per ton.

CHLORINATION WORKS.—A gold brick is on exhibition at the Deadwood National bank, weighing 445 ounces, the result of a ten days run at the chlorination works. The brick is valued at \$8900. Everything is working nicely at the plant, and about seventy tons of ore are being treated daily.

IDAHO.

ORE SHIPMENTS.—*Wood River Times*, Jan. 7: The following statement of ore shipped from Hailey during 1890 is obtained from the books of the railroad company. By comparing the figures with those for 1889 it will be seen that the output for last year was over double that during the preceding year:

Name of Mine.	Pounds.
Idahoan.....	1,120,000
Red Elephant.....	942,000
Red Cloud.....	493,000
War Dance.....	493,500
Jay Gould.....	319,500
King of the West.....	295,500
Carrie Leonard.....	153,000
Nettie.....	153,000
Nay Aug.....	130,000
Camas.....	49,000
Crosses No. 2 concentrates.....	1,099,000
Odd lots of lease ore.....	1,175,000

Total for 1890.....7,570,500
Total for 1889.....3,698,625

Increase.....3,871,875

A GROUP.—*Idaho World*, Jan. 9: Wm. Sweet has a group of four mines at the head of Muddy, on the Payette divide, that are located magnificently for easy working. The mountain on the Payette side is very steep, and the mines can be tapped at a depth of 800 feet. Mr. Sweet will first sink a shaft to the depth of about 300 feet, and if developments then justify such a tunnel it will be run. The four locations are on one vein, which carries pay ore along the surface the entire distance, and the ledge is large.

COAL.—David Falk, of Boise City, was over at Horseshoe Bend the other day for the purpose of forming a coal company to develop the coal mines of that section. Pard Bowen has recently taken a claim, and will sink 100 feet. Hon. R. H. Robb's vein is showing up finely.

TUNNEL.—Wm. Hagler and Fred Day went up last Wednesday to finish the tunnel running to tap the Silver King, which is located a short distance north of the Washington. The tunnel is now in about 50 feet.

MONTANA.

WILL THOROUGHLY DEVELOP.—*Inter-Mountain*, Jan. 7: Preparations have been made to thoroughly develop the True Fissure group of prospects a few miles north of Livignost. The first contract, which has been let, calls for an extension of the 60-foot shaft to the ore body, which, from its dip, is known to lie directly beneath the present workings. **BOUGHT THE GROUP.**—Five claims on Camp creek, contiguous to Butte, bonded last spring to Angus McQueen, have been sold to a syndicate represented by Charles Chapin of Castle. The consideration is not made public. It must be considerable, however, as one of the properties transferred has been worked at a profit all summer and fall.

THE ANNA C.'S STRIKE.—The recent strike in the Anna C. at Castle is proving greater than first reported. The tunnel has been advanced to feet since the strike, exposing an ore body the full width of the drift. The mine will be thoroughly exploited in the present workings, after which a new tunnel will be started 500 feet lower down the mountain, through which the mine will be worked permanently. The Anna C. gives every promise of developing a bonanza.

BI-METALLIC EXTENSION.—*Phillipsburg Mail*, Jan. 9: Outside work has been going along nicely in the past ten days. The shaft-house is being com-

pleted and the two 70-horse-power boilers are almost in position ready for work. The pit for the engine foundation is being excavated, and the work on the masonry foundation will be commenced to-day. The plant will be in running order early next week, when sinking will be pushed. The new shaft-house with other buildings in this new camp of Comstock presents a neat and substantial appearance. This company have let a contract for the chopping and delivering of several hundred cords of firewood, so that the supply of fuel will be assured for several months to come.

LOWER CALIFORNIA.

ALAMO.—*Cor. Lower Californian*, Jan. 8: There are none but encouraging reports to send out this week from Alamo. A few sorehead miners have left the camp during the last week because they could not get as high wages as they would like, but their places are easily filled by other good miners and at present there are no idle miners in the camp who care to work. Since I wrote you last there have been several important steps taken toward developing the mines not owned by the Princessa Co. Of these might be mentioned the work on the Tarantula, which, in the hands of the wide-awake and modern American, Mr. Mitchell, is handsomely yielding up the yellow metal. Mr. Sherard is still going ahead on the Butler mines and the work on the Scorpion is driving ahead under the foremanship of Mr. Phelps and an efficient force. The Princessa Co. has received its compressor and boiler for the steam drill which will be placed in the Indian mine, where the rock is hard. Mr. Quick, who was formerly foreman on this mine, is in the same position on the Scorpion, while Billy Lawry, late foreman on the Princessa mine, has gone north to look for greener fields. The El Paso mill will crush the rock from the Butler mines.

NEW MEXICO.

ELIZABETH.—*Phillipsburg Mail*, Jan. 3: No mine in Montana is attracting more attention at present than the Elizabeth, and all are hoping that she will develop favorably, as indications promise now. At 472 feet in the shaft, where the crosscut was commenced, the miners were driven out last Saturday by water, and until the new Knowles pump was put to work Sunday morning no further underground work was done. It now transpires that the long-looked-for lead has been struck in the Elizabeth. It is said that the vein which was struck during the last week has a fine appearance and has every indication of being rich, though nothing definite as to its assay value can be ascertained, as the officials of the company at this end are reticent and will divulge nothing. The strike, however, has leaked out.

MINE PURCHASE.—*Silver City Enterprise*, Jan. 9: Capt. Cooney returned from Socorro this week, where he had been to purchase the old Cooney mine and the Silver Fountain, formerly the property of the Silver Hill Mining Co. The property was bought in under a judgment executed for the purchase price, \$29,458.35. During the working days of the property it produced \$50,000 and paid a dividend of \$50,000, but when it failed to pay the company refused to put up, and it has lain idle for several years. The Captain will resume operations after a little.

THE JOHNNY BULL MINE at Stein's Pass is developing at great depth more extensive and richer bodies of ore than were ever encountered nearer surface. First-class miners are now wanted there at \$3 a day. The ores of the Johnny Bull are carbonates of copper with occasional pockets of very rich carbonate of lead, and carbonates of iron, carrying silver and gold. Prospecting work will be carried down to a depth of 200 feet and crosscuts driven at 150 feet to strike the mother vein.

THE FLAGLER WORKS are soon to be enlarged and put in shape for all kinds of ores. It is likely that the ores of the Alpha and Omega, now being shipped at the rate of one car per day, will be treated there.

UTAH.

MINE SALE AT TINTIC.—*Salt Lake Tribune*, Jan. 4: Matt and Pat Condon have been mining in Tintic the past ten years. Few men have done harder work or stuck closer to a mining camp than these brothers have to Tintic, and few have had more abiding faith in the final outcome of that mineral district. They still own some claims there, one lying between the Mammoth and old Copperopolis, which promises well. They did own a group of claims joining the Centennial-Eureka on its south end and extending over south across the summit for nearly a mile. The group consists of the Belcher, Lucky Jack, Rosa, Pine, Red Rapper, Cane, Molliet and Contact. Some time ago they agreed to give one-fourth interest in each of these eight claims to New York parties if they would sink a shaft 700 feet deep or run a tunnel in 700 feet, just as was deemed best. The parties started in to sink a shaft on the Belcher and put in some machinery for that purpose. In November last they took a bond on another one-fourth interest in these claims for \$23,000, and later they got an option on the other one-half for \$100,000. Yesterday they closed the contract and paid the first \$10,000 in cash. The new owners are to go ahead and develop the property and pay a royalty on all ore extracted until the mines are paid for. The Condon Bros. thus get \$123,000 for the eight claims besides what they may receive in royalties up till the final payments are made. Lying as this property does on the Centennial-Eureka extension and running off toward the Mammoth, with ore on the surface running 40 to 50 ounces silver, it certainly promises well for becoming a great mine. The vein crops out 200 feet wide and can be traced out all of 4000 feet. Shafts have been sunk at five different places to a depth of 18 to 20 feet, in each place exposing good ore.

STRIKE IN THE KENTUCKY.—*Park Record*: We again have the pleasure of announcing a new discovery of ore. From time to time items have appeared in these columns regarding the progress of work on the Kentucky claims, Nos. 1 and 2, under lease to William O'Connell. After sinking to the depth of about 70 feet the shaft cut a nice vein of ore, carrying 82 ounces silver and 75 per cent lead. The vein where cut shows about three inches of ore and is widening out with each hour's work that is

being done. This is undoubtedly the same vein the Creole is working to such good advantage at present. This proves beyond a doubt that Treasure Hill was rightly named, and that it is filled with the precious metal. Mr. O'Connell will crowd work on his discovery, and besides continuing the shaft will drift both ways on the vein. The ore is of the same general character found on that hill and the indications are that Mr. O'Connell is close on the trail of a fortune.

ORE AND BULLION SHIPMENTS.—The Ontario mill shipped this week 32 bars of bullion, amounting to 19,401.57 fine ounces silver. This week the Crescent shipped 370,000 pounds of concentrates, making the grand total for all the mines, 1,262,040 pounds. There were received and forwarded from the Mackintosh sampler for the week ending January 10th, the following lots of ore: Ontario, 172,830 pounds; Daly, 132,420; Woodside, 29,410; Anchor, 444,920; May Flower jiggings, 12,350; Nevada Northland, 160,100 pounds; total 952,040 pounds.

THE EAGLE'S NEST GROUP.—The discovery made by Mr. A. E. Hollenbeck and others below town, is turning out immense. Quite a number of assays have been secured from the property and all show a high grade of ore. A sample assayed yesterday showed 548 ounces of silver and 60.1 per cent lead, with \$17.36 in gold. There are ten claims in the group and developments have commenced in earnest. A shaft-house has been erected and a force of men put to work to sink a shaft on the ledge. All the vacant ground in the neighborhood has been located and active developments begun.

Please Remit.

The beginning of a new year is a good time to settle up the debts of the old ones. We are obliged to remind those who owe the PRESS on subscription account, that it will be a great convenience to us if they will soon remit what is due. Those who can also pay in advance will also do us timely and well-appreciated favor. We are doing our best to present a very valuable paper, representing carefully, earnestly and conscientiously the welfare of its intelligent readers and the best interests of the arts, sciences and mining and mechanical industries of the Pacific States.

To do this we deprive ourselves of some of the most lucrative lines of patronage available to the average newspaper.

By paying as promptly as possible, friends, you will greatly encourage us in our sincere efforts to favor you and the best interests of your calling.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

SIMONDS SAW CO., Jan. 10. Capital stock, \$50,000. Directors—John Simonds, Daniel Titus, T. F. Haworth, E. H. Simonds and H. A. Sargent.

PASO FRUIT CO., Jan. 10. Capital stock, \$48,000. Directors—N. J. Bird, J. C. Quinn, G. B. Warren, A. O. Alexander and A. J. Booth.

THE MARKET ST. CABLE RAILWAY CO. has filed amended articles of incorporation to increase the directorate and to construct certain extensions. Directors—Leland Stanford, Chas. F. Crocker, Timothy Hopkins, N. T. Smith and J. L. Willcutt. Chas. F. Crocker is vice-president and J. L. Willcutt secretary of the board.

CITY R. R. CO., Jan. 10 (amended article). Directors—Leland Stanford, Charles F. Crocker, Timothy Hopkins, N. T. Smith, W. V. Huntington, C. E. Green and J. L. Willcutt. Charles F. Crocker is president and J. L. Willcutt secretary of the board.

SAN JOAQUIN VALLEY WAREHOUSE CO., Jan. 14. Capital stock, \$500,000. Directors—Jacob Eppinger, Barry Baldwin, H. Dutard, James Hogg, B. Eulinger, Jas. W. Sperry, Richard D. Girvin, all of S. F., and George and A. B. Sperry, S. S. Bostwick and J. D. Peters of San Joaquin.

COPTIS M. CO., Jan. 14. Capital stock, \$10,000. Location, Nevada. Directors—A. V. Lancaster, W. J. Hayes, H. M. Whitely, E. M. Hall Jr. and J. H. O'Brien.

NAPYAS M. CO., Jan. 14. Capital stock, \$10,000. Location, Nevada. Directors—A. V. Lancaster, W. J. Hayes, H. M. Whitely, E. M. Hall Jr. and J. H. O'Brien.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

H. KELLEY—Modoc and Laeven Coe.
Geo. WILSON—Sacramento Co.
J. P. QUINTELL—San Francisco.
J. C. HOAG—San Francisco.
J. H. CROSSMAN—San Bernardino Co.
F. W. KNAPP—Amador Co.
GEORGE EVANS—Santa Clara Co.
MRS. M. E. DUDLEY—Ventura Co.
W. U. WATSON—Sutter and Yuba Cos.
WILSON MCNICKE—Fresno Co.
ANDREW BRID—Monterey Co.
FRANK S. CHAPIN—Colusa Co.
HELEN B. KING—San Benito Co.
WM. M. HILLARY—Oregon.
WM. HOLDER—Oregon.
H. G. PARSONS—Central California.
ELMER JENKINS—Del Norte Co.
H. C. HENKLE—Capay Valley.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well-known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCRIPPS PRESS Patent Agency (S. F.) from week to week and year to year.

MECHANICAL PROGRESS

DELTA METAL AND ANCIENT ALLOY. According to the Glaser's Annalen, delta metal is a very old alloy, having been known to the old Egyptians. It was first prepared, however, in a scientific manner by Alexander Dick, a German, in 1882. This metal is an alloy of copper, iron and zinc, resembling alchemical and stero-metal, which contain the same elements and are largely used for heavy guns. The delta metal is prepared by taking advantage of the fact that melted zinc will dissolve about 9 per cent of its weight of iron. The saturation point of the zinc depends upon the temperature of metals during the process—the higher the temperature the greater the amount of iron absorbed. At a white heat nearly 20 per cent is taken up. The fluid alloy is then mixed with an amount of copper or copper and tin, which varies according to the purpose for which the metal is intended. The oxides present are removed by the addition of a small quantity of manganese, usually in the form of copper manganese alloy. This metal is tough like wrought iron and has a golden color; it can be drawn into wire and rolled either hot or cold. At a dark red heat it is easily welded and stamped, by which process it is said to become 50 per cent stronger than wrought iron. When melted it is very fluid and can be easily cast, the castings being uniformly dense and showing a fine crystalline fracture on being broken. The melting point is 1,750° F., and the specific gravity is 8.6. It is said to be less affected by the air than phosphor bronze, brass or red bronze. One of its leading excellences is that it perfectly withstands the action of salt water.

THE MANUFACTURE OF CATALAN IRON IN FRANCE.—The industry, which barely 25 years ago was of considerable importance in the Arize district, is still carried on in all its primitive style, with more or less prospect of continued vitality. The workmen engaged in it receive about the same wages as those paid in other industrial occupations in the same locality. The price of the catalan iron is not, as a rule, higher than that of the wrought iron now generally used; it is often less. It is only exceptionally used for general work, because it cannot be obtained in the various exact dimensions of rolled bars, and also on account of its hard steel-like nature, which makes it more difficult to manipulate in working. A good deal is made into bars, suitable for farrier's work, which sell at something like 31 to 32 francs per 100 kilos. Many rough agricultural tools, as plowshares, coulters, mold-boards, etc., are made directly from the bloom (*loupe* or *manse*) as it comes from the forge. These parts, being shaped under the large hammer, are naturally not always so well finished as those made under the small tilt-hammer from modern rolled merchant iron, but they are mostly of a presentable shape and find a ready market, as many are convinced that the metal, as it has special properties, must also be possessed of particular virtues. It certainly wears better, on account of its hardness, than the ordinary forgings, and is sold somewhat cheaper.

AMERICAN CARS AND LOCOMOTIVES FOR FOREIGN RAILWAYS.—Two complete trains of drawing-room cars have just been completed for the Buenos Ayres & Esmeralda Port Railway Company by the Gilbert Car Manufacturing Company of Troy, N. Y. The whole of the material is of the highest class, and the cars are of handsome design and finish. The Government of New South Wales has placed with the Baldwin Locomotive Works an order for 12 10-wheel passenger locomotives, somewhat similar to the engines of the same type built for the Baltimore & Ohio, and now running very successfully on that road. The *Railroad Gazette* says limited weight—on account of the bridge—makes it necessary to reduce the dimensions somewhat, while the application of materials is altered to conform to the practice of the New South Wales Government. The engines will have screw-reversing gear. The service for which they are intended is to haul passenger trains weighing 144 gross tons at a speed of 22 miles per hour up a grade of 176 feet per mile, or trains weighing 176 gross tons at the same speed up grades of 130 feet per mile, there being curves of 528 feet radius on the 130-foot grades. In all important respects the engines will conform to American practice. These engines are to be built with the utmost dispatch and shipped direct to Sydney by steamer.

CAST-IRON TUNNELS.—Two tunnels of cast iron for an electric railway have been built in London and put in operation for rapid transit. They are three miles in length and lie between 40 and 60 feet below the surface of London streets. The tunnels for the up and down lines are formed of cast iron from beginning to end, save where the stations are built, and their diameter is 10 and 10½ feet. The tubes are formed of rings 1 foot 7 inches long, made in sections and bolted together. The tunnels were driven by means of a short cylinder, a trifle larger in its inner diameter than the exterior diameter of the cast-iron tunnel lining. This cylinder has a cutting edge, and is forced forward by hydraulic jacks, butting a circular way into which the lining plates are fitted. The narrow space between the lining and the soil was filled with lime cement forced in under high pressure. In their course the tunnels pass

beneath the bed of the Thames and through the bed of an old water-course, where loose, wet gravel offered some trying obstacles for the engineers to overcome. The entire cost of the line fully equipped was less than \$3,750,000.

WIRE BELTING.—The successful introduction of late of steel wire, in a braided or woven form, as belting for driving machinery of various kinds, is a notable fact, and in respect to which good judges express different opinions. Metallic plates or bands, it is remarked, have been used more or less for belting many years, but however perfect their working may have proved in some cases, they are almost beyond hope of repair when trifling weakness begins to show itself, and though braided or woven belts of wire may be more easily repaired, and if made of a comparatively firm wire would in all probability hug a pulley over its entire width more perfectly than could any hand made of plates or sheets, the fact still remains that the absolutely unyielding nature of the material of which the wire is made, at the points of actual contact, is wholly different from that of the slightly compressible leather or rubber-covered canvas generally employed. It is urged, therefore, that equally favorable results could hardly be expected to attend the use of wire fabric without the yielding material being supplied in the shape of an elastic cover fitted to the pulley. This, however, introduces in an impartial manner the element of wear, and the pulley-covering would no doubt be rapidly destroyed.

MEANS BUSINESS.—That the recent Government armor-plate trials are considered of great importance, is fully shown from the fact that 34 carloads of nickel ore were shipped from Sudbury during the last week of October, their destination being the Navy Yard, Washington, D. C. It is, of course, in the rough, just as it came from the mines, and will have to be smelted and then be kept in the yards until arrangements are perfected for the separation of the nickel from the baser metal with which it is mixed. The nickel will be used for the naval tests going on in this country, taking the more extensive use of the nickel and alloy for armor plate. As the quantity will be very large, even after it has been reduced by the smelting process, there will be enough metal to last for some time.

NEEDLE-MAKING AN OLD INDUSTRY.—The Municipal Council of Saint Omer, in the north of France, has decided to celebrate, next year, the 400th anniversary of the foundation of the first needle factory in France by Christopher Greening, an Englishman. The process of manufacture was greatly improved by one of Greening's successors, a Frenchman named Jean Gruz, who made a large fortune; and the reputation of Saint Omer's needles spread even abroad, surviving in England until the last century. The needle industry in France is at present in a decaying condition, all the finer sorts of needles sold in France being made in England.

COATING WITH LEAD.—Philadelphia manufacturers have a process for coating all kinds of metallic substances with lead, thereby making them rust-proof. They exhibit a number of articles coated with lead which have been exposed to the weather and immersed in acids, that do not show any change, either from the action of the weather or the acids. Some shingle nails, so treated, placed side by side with galvanized nails and exposed for a long time, show no appreciable change, while the galvanized nails show signs of rust.

RAILWAY BRAKES.—An exchange very correctly says: There is a chance for some practical inventor to change to advantage the whole idea of train braking. The brake should be applied to the rail and not to the wheels of the train. Brakes applied to the wheels simply permit the train to skid, and produce flat places on the wheels. Brakes applied to the rails would ease up the momentum of the train in friction between it and something not within itself, which is the thing most desirable.

THE FIRST USE OF THE COMPOUND ENGINE for marine purposes in this country was as long ago as 1825. During that year James P. Allain of New York built compound engines for the Henry Eckford, and soon afterward for several other steamers—notably for the Sun, which made the trip from New York to Albany in 12 hours 18 minutes, with steam at an initial pressure of 100 pounds.

"SOMETIMES," writes a correspondent of a trade paper, "I have had to make holes in steel that was too hard to cut or file easily. Then I make a mixture that will cut a hole. I mix one ounce of sulphate of copper, quarter of an ounce of alum, half a teaspoonful of powdered salt, a gill of vinegar and 20 drops of nitric acid. This will make a hole."

STEEL-BAR TEST.—At a test of steel manufactured at Reading, Pa., the other day, a one-inch bar broke at a strain of 233,333 pounds, "being about 20,000 pounds in excess of the highest record authoritatively known." The test was made under the supervision of Government officers.

IT IS SAID that an Australian photographer secures excellent pictures at a distance of 16 miles.

SCIENTIFIC PROGRESS.

Storing Electric Energy.

Very few people, except those who make it a special study to keep up with scientific progress, know how electric energy is stored or anything definite in regard to the principle or construction of a storage battery, but the whole thing is very simple—in fact any person can make a storage battery for himself. The *New York Tribune* makes this matter very plain to the most ordinary understanding.

The Principle of Electric Storage.

A storage battery consists of a cell, usually of glass or rubber, filled with diluted sulphuric acid, in which flat lead plates are immersed. But a storage battery does not store electricity, as is commonly supposed by the uninitiated. Electricity is not a thing, but a form of energy, and it is this electrical energy that is stored. Falling water is one of the many familiar forms of energy, but we cannot store a waterfall. We can store its energy, however, by making it wind up a spring or pump water—part of itself, perhaps—into a reservoir, or compress air, or lift a heavy weight. Then at some future time this stored energy can be used to do work. The wound-up spring, the water in the reservoir, the compressed air or the lifted weight may represent a part of the energy of the waterfall, and either may be made to do work. Here we have the energy of the waterfall lifting a weight—that is to say, separating two things, the earth and the weight, that have a strong mutual attraction. The weight, when raised, is said to have energy by virtue of its position, and if allowed to fall it can do work and reproduce the exact amount of energy expended in raising it. For example, it could be made to pump water back to the top of the fall; then this water could fall again and raise the weight. However, in doing this a little of the energy is lost or wasted each time by the friction of the machinery and the air, and presently our see-saw arrangement would come to rest like any other see-saw or swing. So it is with a storage battery. We can fill it with electrical energy. If we allow a current of electricity to flow through a storage battery, the electrical energy separates certain elements of the battery that have a strong chemical attraction for each other, and when these elements are allowed to "fall"—that is, resume their former or natural state—the stored electrical energy is reproduced in the shape of an electric current. Just as the falling water raised the weight, and again the falling weight raised the water, so the electric current separates the battery elements, and the battery elements, resuming their natural state, reproduce the electric current. But here, too, as in the other case, energy is lost or wasted each time the change is made, and a state of rest is the final result. For continuous motion or power, we must have an endless source of energy. Coal, wood and waterfalls represent some of our reservoirs of stored energy.

How Any One Can Construct a Storage Battery.

The simplest form of storage battery can be made by any one with a test tube or a tumbler. Fill it about three-quarters full of water; then pour in sulphuric acid slowly, very slowly, not faster than a trickle, and at the same time stir with a clean stick till the solution is very acid to the taste. Mind you never on any account pour the water into the acid, for that would rapidly generate great heat and might do serious harm. Now stand in the tumbler or cell two flat pieces of sheet lead as wide as the cell will permit and tall enough to reach one or two inches above the surface of the acid solution. Place two clean rubber bands around one of the plates—one band near the top and the other near the bottom. Then bind the two plates together with two rubber bands so that the two lead plates do not touch each other anywhere. Connect one plate by means of a copper wire to one pole of a battery or dynamo and the other plate in the same way to the other pole of the battery or dynamo. Finally, allow a small current to flow—about one or two amperes. If the source of electricity is too powerful, place a resistance in circuit, such as German silver wire or incandescent lamps. When the current has been flowing for about four or five hours it will be noticed that one lead plate has become brown and the other gray. Now disconnect the wires from the source, and on touching the two ends of the wires together a small spark will be noticed. If the ends be kept together for a short time the storage battery will discharge itself and must then be recharged. After the first charge the brown plate, which is called the positive plate, must always be connected to the positive pole of the dynamo or source for the purposes of recharging. If the storage battery be charged and discharged a good many times the capacity of the battery will be greatly increased—that is, a greater discharge can be obtained compared with the charge. This process of charging and discharging is called "forming," and until a storage battery is "formed" it will return but a small proportion of the current or energy used in charging. In discharging the acid will become weak, but in charging the strength of the acid is wholly restored.

ELECTRIC ADHESION.—The question of the reality of electrical adhesion and of making a practical use of it in operating railroad trains

is still under discussion among engineers, with the odds in favor of the affirmative. It is claimed that adhesion is clearly manifested even when the rails are covered with water or oil. The advantages which it is thought may be derived therefrom are claimed to be manifold. It would seem to be a matter of ready proof whether there is anything in it or not. The philosophy of the principle, if it exists, is thought to be in a slight heating and consequent softening of the surfaces of both wheels and rails. It is well known that even a weak current of electricity produces a great heat upon the surface of iron when passed over it.

Ancient Roman and Pompeian Relics.

Some new discoveries have been made at Pompeii, near the Stabiana Gate, and a description is given of them. *Nature* states that three bodies were found, two being those of men and the third that of a woman. Not far from the resting-place of these bodies was the trunk of a tree, 3 meters in height and measuring 40 centimeters in diameter. This tree, together with its fruits that were found with it, has been examined by the professor of botany, M. Paquale, who finds in it a variety of *Laurus nobilis*. By means of the fruits, since they come to maturity in the autumn, he concludes that the eruption did not take place in August, but in November.

The Roman city of Cissa was last mentioned in 679, and even its site has long been forgotten. Submarine ruins lately found indicate that the island was sunk by some catastrophe. The *English News* states that the commission in charge of the improvement of the city of Rome has unearthed great quantities of lead water pipe, each plainly stamped with the name of the owner of the house, the year of the plumbing, the names of the consultants for that year, and that of the reigning emperor. In opening the 32 miles of new streets in that city, material has been found sufficient to add to our present knowledge a thousand details concerning the baths, heating flues, water pipes and house-sewer pipes, the organization of the police and fire brigades, etc.

Known Before.

From the excavations at Pompeii, instruments have been found, both surgical and dental, almost identical with our own. In others, as in the works of Hippocrates and in the "Susruta," a commentary on the "Yajna Veda" of the Hindoos, full descriptions are given of more than a hundred surgical instruments of steel, of many kinds of bandages and the specifications for a splint, like the patented bamboo splint now used by the British army surgeons. Susruta also describes surgical operations which are claimed as glories of nineteenth-century surgery. The surgical operation for the stone, and the rhinoplasty, or that which consists in making an artificial nose from flesh and skin taken from the patient's own forehead, were fully known and practiced by the ancient Hindoos; and, finally, the aseptic treatment of wounds, one of the glories of modern surgery, is proved to be a rediscovery. Hippocrates, in his book on wounds, which is a small manual on this method of treatment, describes it and calls it by the Greek word for non-putrescible.

MODERN GUNNERY—SHELLS THROWN FIFTY MILES.—A very good idea may be formed of the possibilities of modern gunnery from a brief account of some experiments recently made at Sandy Hook, near New York. The gun was a 30-foot cast steel rifle with a 12-inch bore. The gun was first loaded with 100 pounds of powder and a hollow shell. The charge of powder was gradually increased until 250 pounds was used as a load. The gun stood the heavy charges, but the report was heard nearly 40 miles down the coast. The gun was pointed out to sea and Corporal McDonald was sent off shore in a small boat to see how far it could throw the big shells. The men in charge of the gun were warned by signals later to stop throwing shells into the sea, as several vessels were approaching the mouth of the harbor. Corporal McDonald says the gun hurled the shells a distance of nearly 15 miles.

NOVELTY IN ICE MANUFACTURE.—It is said that among the new inventions seen at the recent Mechanics' Fair at Boston, a method was shown of making ice by simply dropping a few crystals in water—the secret of whose composition is only known to the inventor. Not only is the ice made in a remarkably short space of time, but ice-cream is also manufactured and eaten by those who stand and wait.

NATURE'S PROCESSES.—The study of the radiation of the fire-fly demonstrates that it is possible to produce light without heat other than in the light itself; that this is actually effected by nature's processes and that these are cheaper.

INCANDESCENT LAMPS placed near the ceiling will cause it to blacken, contrary to general belief. The blackening is due to a current of hot air which deposits black particles on contact with a cold surface.

TENACITY OF PLATINUM.—It is said—but it should be taken with some grains of allowance—that platinum can now be drawn into wire strands so fine that 27 twisted together can be inserted into the hollow of a hair.

ENGINEERING NOTES.

Restoration of Abandoned Canals.

The value and importance of canals as a means of transportation is once more coming to the front, after the long sleep to which such conveyance was relegated by the advent of the railroad. Many old canals are now being again brought into use, and new ones are being suggested or are in actual process of construction. In connection with this revival of an old and almost obsolete mode of transportation, the subject of

Improvement in Canal Propulsion

Forms a most important matter of consideration. It always happens that new discoveries revive and awaken to new usefulness arts and agencies that are fast becoming obsolete. Thus electricians are trying to chain the lightning to the sleepy canal-boat. There can be no objection to overhead wires in that case. The water-power from locks and overflows furnishes power to drive the generator, and only a screw propeller and an electric motor on the boat are needed to complete the chain of mechanism. The points of weakness in this project are that in the majority of canals propulsion by any power that sits up the water is not permissible on account of the washing-down of the banks, and that the water-power would not be sufficient in canals running across flat countries where canal systems are most feasible. Even under the most favorable circumstances, the dry season would be apt to cripple the plant.

Steam on Canals.

In the State canals of New York, after a protracted trial, steam canal-boats have conquered prejudice and become established as indispensable. There are perhaps 100 such boats already in service, and each is capable of towing from three to five other boats. One of the finest of the steamboats—the John B. Dallas—is 96½ by 17½ feet. Her machinery consists of a 14 by 16 inch cylinder engine, fed from a large boiler built to stand a pressure of 140 pounds to the square inch. The consumption of coal from Buffalo to New York is about 45 tons, at \$3 per ton for pea. She can herself carry 6100 bushels of grain, and can tow four other boats of 3300 bushels capacity each, making the capacity of the fleet 39,300 bushels. With two boats in tow, the John B. Dallas makes the trip between Buffalo and New York in a trifle over seven days, and with four boats in tow she makes it in about 10½ days. Under the old style of boating it requires six horses or mules to bring two boats from Buffalo to New York City in 13 or 14 days.

Inclined Planes for Canals.

An interesting paper was read at the recent congress at Manchester, England, on canal navigation, by M. Flamant, on a system of inclined planes, to supersede the use of locks on canals. Inclined planes have been coming into use for this purpose lately in which a water-chamber receives the boat, and the whole is drawn up the plane. The chamber has, however, been placed lengthwise to the track, and thus, if the boat is of any length and the incline at all steep, a large chamber is required to maintain the water level for the length of the boat. By the system described by M. Flamant, the water-chamber is placed with its length across the track, and the gradient of the plane is fixed at one in two. It is proposed to connect the ascending with the descending boat chamber by chains to economize power.

The Mule Must Be Superseded.

In this day of steam, electricity and fast transportation in general, the motive-power of the old canal—the mule—cannot be considered as a thing to be continued. In discussing the question now being agitated in Eastern Pennsylvania and New York in regard to the necessity for remodeling the motive-power employed by the Washington & Cumberland Canal Co., in view of the rapidly increasing coal and timber business crowding upon their lines of transportation, the *American Manufacturer* says: The motive-power of the old canal—the mule—is not to be thought of. Steam offers but few more advantages, because it takes up so great a percentage of the carrying capacity of the boat, while the looks and the amount of help required stand in the way of using tugs. It was finally suggested that electricity should be used. The trolley system, by which small screw propellers could be run by electricity, was looked upon as the best solution of the problem. By using electricity the weight of machinery to be carried would be small, and one man could control the motor and the steering apparatus without trouble. The plan is under serious consideration, and will probably be given a thorough test. If it prove successful it may result in the restoration of abandoned canals and induce capital to seek an investment in new ones between points where heavy freight not requiring rapid transit are shipped extensively.

A Portage Railway for Canal Boats.

But the projects of those who are laboring for the restoration of the Chesapeake & Ohio canal do not stop here. It is proposed to build a portage railway from Washington, D. C., to the terminus of the canal, at Annapolis, Md., on the Chesapeake bay, for the transportation of the canal boats, cargo and all. By this means the boats could reach not only tidewater but almost any port on the Atlantic. They could be built on the plan of the lately devised

sea-going coal barges used in transporting coal from Norfolk to New England cities. The boats could be loaded at the mines in the Cumberland coal region, and without rehandling the coal could be delivered at any seaport on the Atlantic. The great objection to shipping coal partly by boat and partly by rail is the breakage of the coal in handling. This scheme would do away with that entirely, and Cumberland coal could be shipped "all water" to any port on the eastern coast without handling at all.

The timber and coal freights of the region traversed by the canal have increased from comparatively nothing to thousands of tons within a few years, and the monthly reports of Cumberland coal shipments show a regular increase that is amazing. As yet nothing definite has been done in the project we have outlined, but the slightest examination will show its great possibilities.

A FIRELESS LOCOMOTIVE FOR MINES.—M. C. Rolland, in Mons, Belgium, has constructed a fireless locomotive for use in mines. It is provided with a tank that holds 0.550 cubic meter. The water is heated to 205° C. (or an absolute tension of 16 atmospheres) by a boiler placed on the surface; it is sufficient for a steady run of three to four kilometers. The heating is brought about by means of steam jets, as first proposed by Mr. Bede, Belgium. The heat thus stored up in the rather small space gradually evaporates the water required to run the machinery. At a speed of two meters per second, the locomotive works with six-horse power, that of a horse being generally estimated at from 0.9 to 1.0 m., so that the locomotive, working day and night uninterruptedly, takes the place of from 12 to 18 horses, besides a good many laborers. The saving is calculated to be \$200 per horse dispensed with. As a further advantage, this locomotive secures better ventilation. The weight of the locomotive is 3000 kg.

RISE AND PROGRESS OF STEAM NAVIGATION. In 50 years steamships in Great Britain have increased in tonnage from 67,969 to 4,318,153 tons, while their proportion to the total registered tonnage of British ships has increased from 1 to 41 to 1 to 214. The first Condors were only 207 feet long and 34 feet 4 inches beam, while the first steamer which plied regularly between Liverpool and New York, the Royal William, measured only 175 feet in length. The steps by which the marine engine has developed have been, first, the screw propeller, then the introduction of iron and steel in the building of ships, then the increase of steam pressure in the boiler, then the adoption of surface condensation, followed by the use of compound and duplicate expansion cylinders, and a much larger increase in boiler pressure, rendered possible by the use of mild steel in the construction of boilers, thus effecting in all a reduction of 70 per cent in the consumption of coal and an increase of 110 per cent in speed.

PROGRESS ON THE HUDSON-RIVER TUNNEL.—The *Scientific American* of Jan. 3d says that about 470 feet have been added to the Hudson-river tunnel since Nov. 1, 1890, which brings the total completed length up to 2720 feet. This indicates a progress at the rate of about seven feet per day. The work is progressing without interruption. By removing the intermediate accumulating pump, and bringing the power of the pump direct to the hydraulic jacks, the Beach pneumatic shield is advanced the width of one of the rings in eight minutes, a progress formerly requiring from two to four hours. Formerly, the great trouble was in getting the shield ahead; at present the great obstacle is in getting away the excavated dirt rapidly enough. A system of chutes is soon to be tried, one under each opening in the shield front, down which the dirt will slide direct into the waiting cars, instead of shoveling it by hand as heretofore. The company hopes to record ten feet per day when these changes are completed.

THE NICARAGUA CANAL.—It is reported that work has been commenced on the "most formidable piece of excavation" on the entire line of this work. The piece of work referred to is a cold rock cut about 13 miles from the Gulf terminus. A very large amount of dredging has already been done in the lowland between this point and the Gulf coast. Work on this great improvement will not be suffered to stop for a day on account of funds. If American capitalists do not come forward promptly with the money as fast as needed, English capitalists stand ready to take their place—a condition which neither our people nor our Government ought to allow to occur. It will be a burning shame and a circumstance which will afford endless international complications in the future if such a neglect should be permitted.

PROPOSED TOLL-ROAD IN ALASKA.—Alaska miners are interested in the matter of a proposed trail or toll-road from the head of Lynn canal to the headwaters of the Yukon, to afford a short-cut route for sending supplies into the interior.

TRIALS OF THREE LARGE STEAMERS show that propellers of small diameter have in each case proved the more economical and effective, both increasing the speed and reducing the coal consumption.

USEFUL INFORMATION.

Apparatus for Preventing Fires in Elevator Shafts.

Although elevators and their vertical shafts are a modern necessity not to be dispensed with, yet it is a well-known fact, based on abundant experience, that a fire in a lower compartment will lunge toward the elevator shaft by the nearest possible route, and reaching it, will go up with a howl, and in a very few minutes no fire department can stop its progress. A fire seems to be almost endowed with conscious intelligence by the way it reaches for the elevator shaft soon after it is started. This brings us to the problem, "How shall we maintain the elevator system and yet escape the disastrous possibilities that are a constant menace too frequently realized?" This problem has received the intelligent attention of a practical inventor, Abraham McLaughlin, of Pittsburgh, Pa., and has resulted in the production of a means, the mechanical features of which embody every requisite conducive to success. The leading feature of the invention consists in a hinged trap-door, that normally is turned vertically and stands close to the shaft wall, being retained by a trip arm catch that engages the top edge. This trip arm can be dispensed with, and the cord that lets the trap down may be made to retain it in an elevated position, the said cord being extended down to various accessible points, and may even extend into the office of the building. An open slot extends to the middle of the trap-door, in order that the rope will not interfere with its descent. The door is formed with an auxiliary bottom of sheet metal with an intervening space or chamber. Within this space is a V-shaped formation, the angle of which is presented outwardly for a purpose hereinafter understood. Closely contiguous to the shaft is a stand pipe for water having a short branch, so located as to lead to a point opposite the aforementioned V and the inturned nozzle. When the valve in the branch is opened, as it may be by pulling a cord which may extend to all parts of the building, it dashes the water to each side, where it escapes downward, through perforations about the edge of the bottom sheet, and thus drenches the walls of the shaft, tending to extinguish the fire besides retarding it. The water valve is preferably under independent control by a pull cord, and the door is under all ordinary circumstances entirely out of the way, remaining so perhaps for years, but ready at any critical moment to be closed, should flames break out. For so important an office this device is remarkably simple, and readily adapted to any elevator shaft already constructed.—*The Artisan*.

MARSTON'S WEIGHING FORK.—It is a good plan to be systematic in all things that are susceptible to system, and feeding stock is a feature which is eminently worthy of systematic methods. In this direction it would be well to have some ready device for weighing hay as it is fed out. Such a device is now offered in a "weighing fork," recently patented by N. B. Marston of Lebanon, N. H. The handle is in two sections, united by a hinge joint. A rigid arm or spur secured to the head section projects downwardly, and its tip joined to a compression coil spring, whose other end is secured to the handle section. Pivoted to the latter is a short arm, whose free end moves along a curved index bar that is marked with the scale graduations. The short end of the arm is connected by a small rod to the rigid arm of the head section. When a fork full of hay is picked up, the head section is depressed, assuming a somewhat angular relation to the handle section. This causes a compression of the spring and a movement of the index arm, just according to the weight of the hay, thus giving a very close approximation of the quantity. The advantage and convenience of this device is obvious, and it should come into very general use.

TO BENEFIT THE HORSES.—Next to perpetual motion, more time has been wasted by inventive cranks on an apparatus for helping horses to start heavy loads than on any other apparent impossibility; but a genius has at last got a starting spring to work, secured a patent, and produced a very striking working model. His plan is to fix a friction drum on each axle, attached to a lever in such a manner that when the horses begin to pull they exert their power on the axle and set the vehicle in motion very slowly. By the time it is really started, the play on the lever is exhausted and the hauling is done in the usual manner. For starting loaded street vehicles, the device seems perfect. Of course it is applicable to start cars or any other kind of road vehicles.

TIPPING CIGARS FOR IGNITION.—A druggist in St. Petersburg has invented a method of tipping cigars with a preparation so that they are lighted, like a match, by rubbing against any hard surface. A manufacturing company is said to have paid him 60,000 roubles for the patent.

IN BURNING COAL, a certain amount of air admitted to the furnace above the live coal is advantageous rather than otherwise, if the supply be regulated. The oxygen of the air, thus introduced, assists in the more effective combustion of the gases.

GOOD HEALTH.

Washing Out the Stomach.

During the past year, says the *Scientific American*, several physicians in New York have tried, with gratifying success, a novel treatment for dyspepsia and cancer of the stomach by washing out that organ. The process is very simple and not dangerous. A long, flexible pipe is passed down the throat until one end is in the stomach. The upper end has a funnel attached, into which hot water is poured until the stomach is filled. The weight of the water in the pipe and funnel gives a hydraulic pressure sufficient to distend the stomach. The pipe has an aperture big enough to hold a lead-pen. After the stomach has been filled, the funnel end of the pipe is turned down until it is lower than the bottom of the stomach, and the stomach is emptied as a barrel of any fluid is emptied through a siphon. The process may be repeated several times. The result is that the undigested food and mucus are washed out, and the hot water closes the blood-vessels and reduces inflammation. The relief is immediate. The dyspeptic may have his stomach washed out before a meal, so that he can take a fresh start. After the lapse of sufficient time for ordinary digestion, the stomach may be washed out again. This process has been in use at the New York Hospital, we are informed, for some time.

A physician of this city has been trying this washing-out process for cancer in the stomach, but without any success whatever. A cruel and useless blistering process was also employed. Between the two, the patient is well-nigh "used up," but she will get relief from unnecessary torment, if not from the cancer itself, by the mild treatment she is now receiving from our San Francisco cancer specialist.

CAR SICKNESS AND EYE STRAIN.—Considerable has been said of late in regard to "car sickness." A medical practitioner recently wrote in this connection as follows: I should like to call attention to car sickness in connection with eye strain. I have had eight or nine cases of this kind, all of which were relieved by glasses. One case was that of a gentleman who every journey had car sickness. While he had the mydriatic in his eyes he went to Washington and suffered no inconvenience whatever. Subsequently, after he had glasses, he made a trip to St. Paul without any of the former trouble. Recently I have had two cases—one that of a girl who could not ride a short distance in the street car without vomiting. I found a decided degree of hyperopic astigmatism. With the mydriatic in her eyes, she rode home without her usual trouble. A strange thing with reference to eye strain is that it often exists to an exceptional degree without showing any symptoms in the eye. The patient will often say that the eyes are perfectly good and have never caused any irritation. The reflexes seem to have settled in some other place. This is an interesting pathological and physiological question.

HOW TO ESCAPE MALARIA.—"You people who are afraid of malaria—and it is a good complaint to be afraid of—have some strange ideas about the disease," said a physician. "You think that if you climb a mountain and build there, or that if you live on the slope of a hill where the drainage is perfect, you are safe. Then coming on this, you sit around in the evening air with no covering on your head, or you sleep with a window so near the head of your bed that a current of damp air blows over you all night. Finest way in the world to catch malaria. Personally, I believe that if I had only two chances—one living in the center of a salt marsh and the other of living one mile from the edge of the marsh on sloping ground—I should take the marsh every time. I admit, however, that there are very many people who do not agree with this opinion. But to come back to our first proposition—cover your head when you are out of doors after dark, no matter how mild the air seems. Young girls who at summer resorts rush from a hot hall room to open verandas, take their lives in their hands. Most of them are so wildly reckless that it is a wonder they live through one season."

NO PUTREFACTION IN DEEP-SEA WATER.—Dr. Regnard has raised the question in one of the medical journals as to whether a corpse which sinks to a very great depth is preserved indefinitely or otherwise from putrefaction. According to his researches, which have been published at some length in the archives of the Biological Society of Paris, putrefaction is not found to take place in decomposable substances submitted to a pressure of 900 to 700 atmospheres; these figures corresponding to a depth of 9000 or 7000 meters at sea. From these experiments it must be concluded, according to Dr. Regnard, that there is a total absence of putrefaction in the greater depths of the sea.

CASTINGS UNDER PRESSURE.—The whole art of making castings under pressure needs to be more thoroughly studied. It is as yet only in its infancy. There is needed a casting machine which will do in iron and brass that which the type-casting machine does in type metal. Here is a chance for inventors.



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Business Announcements.

[NEW THIS ISSUE.]

Mining Machinery—Ridson Iron Works.
Situation Wanted—M. K., No. 100, this office.
Situation Wanted—Chemist, this office.
Books—H. C. Baird & Co., Philadelphia.

See Advertising Columns.

Passing Events.

Extreme cold weather in the higher mountains has had an effect on mining operations in some localities. The water ditches became frozen and the mines of Grass Valley were without power for some days, throwing miners out of work.

In another column we print the remarks by the Governor of the State on hydraulic mining. It is notable that this is the first time in years that any official declaration in favor of the industry has been made, indicating a marked change in popular opinion on the subject.

The passage by the U. S. Senate of a simple bill providing for the free coinage of silver is the greatest victory the silver men have yet had. It is highly probable that the House will concur in this action, thus settling the long-contested question.

The latest dispatches indicate that there is no longer any fear of an Indian war and that the rebellious Sioux will submit to the plans of Gen. Miles.

Bullion Products of 1890.

The annual statement of the product of precious metals in the United States and Mexico for the year ending Dec. 31, 1890, has been prepared by John J. Valentine, vice-president and general manager of Wells, Fargo & Co.'s Express. The report of precious metals produced in the States and Territories west of the Missouri river (including British Columbia) during 1890 shows, in the aggregate: Gold, \$32,156,916; silver, \$62,830,831; copper, \$20,569,092; lead, \$11,509,571; total gross result, \$127,166,410. The "commercial" value at which the several metals have been estimated is: Silver, \$1.04 per ounce; copper, 14 cents per pound, and lead, \$4.30 per hundred weight.

As in former reports, allowance must be made for probable variations from exact figures, by reason of constantly increasing facilities for transporting bullion, ores and base metals from the mines outside of the express, and the difficulty of getting entirely reliable data from private sources. Especially is such the case in the reports from Montana and Colorado. Statistics gathered in this way are liable to be exaggerated, but, with some modifications on this account, made herein, the final general results reached, while only approximately correct, may be accepted as the closest approximation possible under the circumstances. No bullion or coin was received by Wells, Fargo & Co.'s Express from the West Coast of Mexico during 1890.

The total product of gold dust and bullion, silver bullion and ores and base bullion received by express, freight and other conveyances during the year is as follows in the States and Territories named:

States and Territories.	Total
California.....	\$11,781,114
Nevada.....	9,240,538
Oregon.....	1,038,000
Washington.....	279,000
Alaska.....	762,811
Idaho.....	13,524,500
Montana.....	34,314,955
Utah.....	12,259,176
Colorado.....	27,275,447
New Mexico.....	4,535,067
Arizona.....	7,597,349
Dakota.....	3,045,560
Texas.....	249,423
British Columbia.....	361,555

Total.....\$127,166,410

The gross yield for 1890, segregated, is approximately as follows:

Gold, 26.29.....	\$32,156,916
Silver, 49.49.....	62,830,831
Copper, 16.17.....	20,569,092
Lead, 9.05.....	11,509,571
Total.....	\$127,166,410

The following table shows the total annual products of gold, silver, copper and lead, in the States and Territories west of the Missouri river, for the 21 years from 1870 to 1890, inclusive.

YEAR.	Product after deducting amounts from British Columbia and west coast of Mexico.	Product after deducting amounts from British Columbia and west coast of Mexico.	Product after deducting amounts from British Columbia and west coast of Mexico.	Product after deducting amounts from British Columbia and west coast of Mexico.
1870.....	\$2,296,659	\$60,361,634	\$2,200,000	\$19,934,429
1871.....	7,205,693	70,139,880	3,000,000	27,139,880
1872.....	12,205,693	70,139,880	3,000,000	27,139,880
1873.....	12,205,693	70,139,880	3,000,000	27,139,880
1874.....	12,205,693	70,139,880	3,000,000	27,139,880
1875.....	12,205,693	70,139,880	3,000,000	27,139,880
1876.....	12,205,693	70,139,880	3,000,000	27,139,880
1877.....	12,205,693	70,139,880	3,000,000	27,139,880
1878.....	12,205,693	70,139,880	3,000,000	27,139,880
1879.....	12,205,693	70,139,880	3,000,000	27,139,880
1880.....	12,205,693	70,139,880	3,000,000	27,139,880
1881.....	12,205,693	70,139,880	3,000,000	27,139,880
1882.....	12,205,693	70,139,880	3,000,000	27,139,880
1883.....	12,205,693	70,139,880	3,000,000	27,139,880
1884.....	12,205,693	70,139,880	3,000,000	27,139,880
1885.....	12,205,693	70,139,880	3,000,000	27,139,880
1886.....	12,205,693	70,139,880	3,000,000	27,139,880
1887.....	12,205,693	70,139,880	3,000,000	27,139,880
1888.....	12,205,693	70,139,880	3,000,000	27,139,880
1889.....	12,205,693	70,139,880	3,000,000	27,139,880
1890.....	12,205,693	70,139,880	3,000,000	27,139,880

The dividends paid by Colorado mining companies during 1890, and which were made public, were: The Aspen Mining and Smelting Co., \$200,000; Calliope, \$40,000; Little Chief, \$10,000; Little Rule, \$30,000; Matchless, \$100,000; May Mazappa, \$70,000; New Guston, \$367,500; Oro, \$95,000; Smell Hopes, \$25,000; Yankee Girl, \$245,000.

Precious-Metal Production.

In the tables of bullion product compiled by Wells, Fargo & Co.'s Express Co., which are recognized as being approximately correct, California takes the fifth place this year. But those States which lead her show their increase mainly in the direction of copper and lead, rather than in what are known generally as the precious metals. Montana, which is far ahead of others, makes her big figures largely from her copper values. Out of the \$34,314,955 credited to that State by Wells, Fargo & Co., the Anaconda copper mine alone (belonging largely to a San Francisco man) produced \$15,940,000, Colorado produced over \$5,000,000 worth of lead, Utah produced \$3,492,209 in silver and \$677,020 in gold, the balance of her product being lead and copper.

Now in California we produce very little lead, not very much silver and no very great amount of copper, though last week \$04,655 pounds of copper matte were shipped East from San Francisco. Most of our product is in reality a precious metal, gold, and if the hydraulic miners were permitted to work, this product would be about doubled.

The State of California in reality yielded a larger mineral product than is credited to it, but as it did not come in the form of "bullion"—base or otherwise—it does not appear in the tables referred to. Our product of quicksilver alone was worth about a million and a half, and no other State produces this. Then the borax, of which no other State except Nevada yields any, is of great value. Our mineral oils run up into the millions in value. The chrome ores shipped, the manganese, pyrites, and a dozen other products of the miners' work are not credited to the State in the returns, though the lead and copper of other States swell the value of their respective totals in mineral products.

California still leads all other States in its gold product, and such is the variety of its other mineral products, that were they all counted, the figures would doubtless exceed the value of those of the other States with the exception of Montana and Colorado.

Free Coinage.

On last Wednesday the bimetallicists in the U. S. Senate gained a signal victory in passing a purely free-coinage bill, which provides that the unit of value in the United States shall be the dollar, to be coined of standard silver 412½ grains or standard gold 25.8 grains. Although the debate on the silver bill and the votes recorded in favor of all amendments to the original bill indicated that a more liberal silver bill would be passed, yet there was nothing in the action of bimetallicists which could be accepted as liable to lead to the above gratifying result. The bill as passed will now go to the House of Representatives for action. Those who have made the subject a close study claim that the House will pass the bill as it came from the Senate. This belief is grounded upon private advices received from Washington, which claim that quite a number of Congressmen will sink their individual opinions and vote to remonetize silver in conformity with the views of their constituents as expressed by the congressional elections held last fall.

Silver Bullion Certificates.

The Stock and Bond Exchange of this city now intends following the custom of the New York Stock Exchange in listing "silver bullion certificates." The California Safe Deposit and Trust Company will store silver bars, not less than .997 fine or weighing over 1300 ounces, assayed by the United States Mint or the Selby Smelting and Lead Company, and will issue a "silver bullion certificate" for each bar, subject to a storage charge of two cents per 1000 ounces per day. By this means the public will have a chance to speculate according to their various financial and political views, and a "silver bullion certificate" will be collateral to our banks.

THE SILVER LAW TEST.—Secretary Windom has written to Merriok and Moore, the gentlemen who presented the silver brick at the Philadelphia Mint and demanded its coinage, that he can find no warrant in law for complying with their demand.

Accurate Surveys Not Necessary.

In making a mining location, it is not necessary to have a surveyor measure off the ground and adopt his description of the location, as if for patent proceedings. In fact, in the recent decision of White vs. Lee, the Supreme Court holds that locations made on such surveys do not comply with the law. The court says:

The men for whose information the boundaries are required to be marked wander over the mountains with a very small outfit. They do not take surveyors with them to ascertain where the section lines run, and ordinarily it will do them no good to be informed as to quarter-sections or magnetic variations. To say that a location thus made with reference to legal subdivisions is sufficient would, in our opinion, defeat the purposes of the requirement.

The proper mode to locate is to mark the claim in such a manner that any ordinary man, without engineering knowledge, can learn its boundaries from the notice and monuments. A few men in a district starting on the detail plan would compel every one else to employ a surveyor to assist in locating the claim. This decision is one of the very few from the courts which simplify regulations for the mining community.

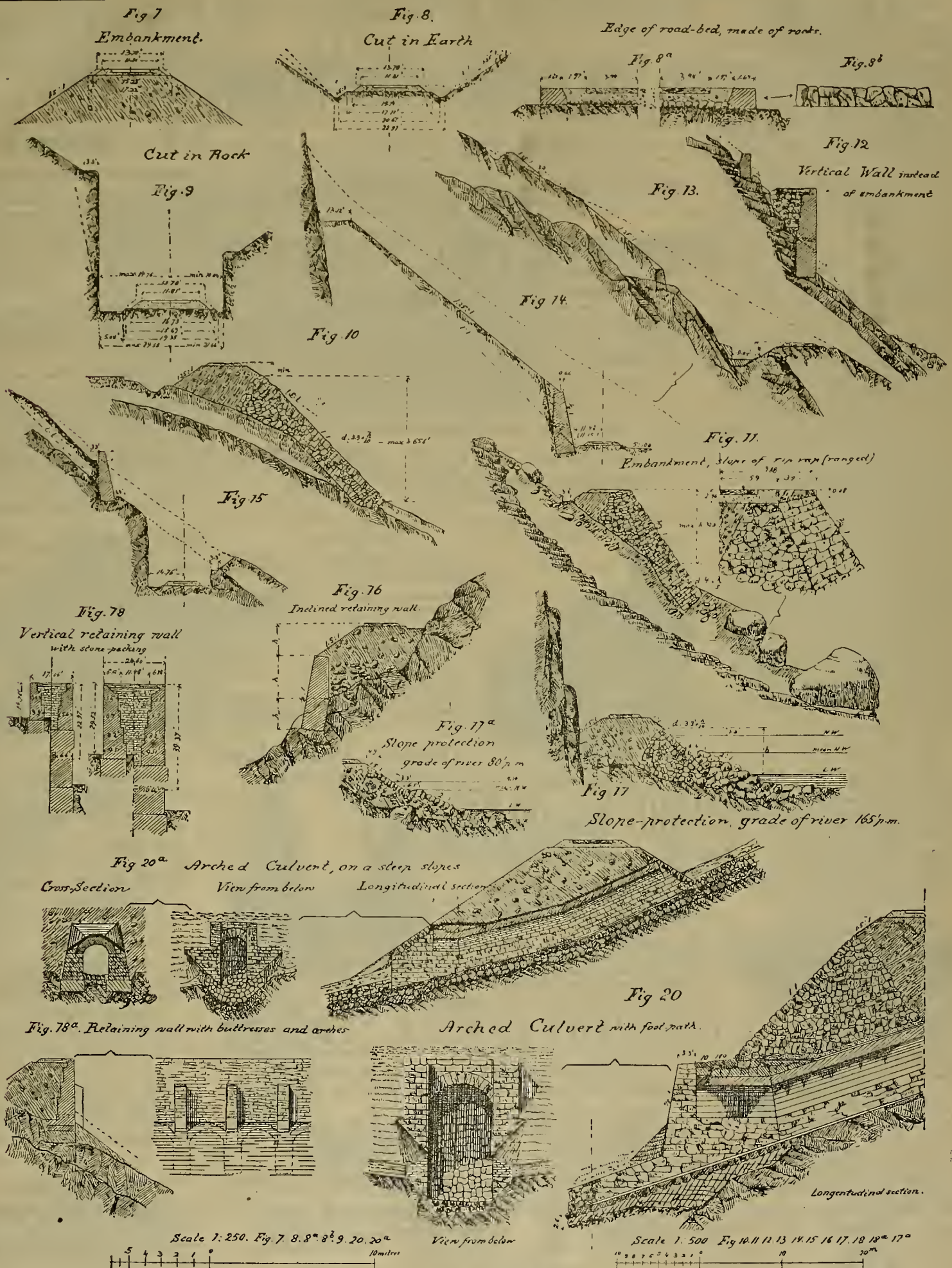
Roadbed Construction in the Mountains.

The rough nature of the Alps, with their narrow, very sinuous and steep valleys, inclosed by precipices and high mountains, make the construction of railroads there very difficult. To avoid the snows of high altitudes, long summit tunnels had to be made. The Mont Cenis tunnel is 7.56 miles long, with 5250 feet of rock above it; the Gotthard tunnel is 9.3 miles long and the rock above it is 5650 feet high; the Arlberg tunnel is 6.35 miles long and the mountain over it is 2300 feet above the tunnel level.

On the Gotthard railroad, the valley slopes are in a continuous state of instability. During the winter months the ground is in a comparatively quiet state; it is covered with immense masses of snow and ice which come down into the main valley, sometimes as avalanches. The dangers of the geological and climatic conditions require a very careful location and construction of the road. Each case had to be studied separately and he treated individually; numerous viaducts and bridges had to be built; also galleries and strong archways to protect the road from slides and avalanches; aqueducts to lead torrential streams over the road; tunnels to avoid the dangers of avalanches and mountain slides.

The principles of construction of the roadbed of the St. Gotthard road are of interest to engineers on this coast where there is so much mountain railroading. The width of the single-track road-bed, measured on a level with the upper surface of the ties, is 13.8 feet in the mountain divisions and 13.1 in the valley divisions. The embankments, usually made of rocky material, have slopes of 1½:1; if no fertile earth was obtainable, the slopes were covered with a layer of head-land rocks two feet thick (see Figs. 7, 8a 8b and 9 of accompanying cuts). When steeper slopes were necessary, the slopes were made of rip-rap 1:1, up to a height of 65 feet (Fig. 10) and of dry masonry, with a slope of ¾:1; if the embankments were not higher than 33 feet (Fig. 11). Retaining walls of masonry in mortar were either built with an outer slope of 1.5:1 or vertical; if high, loose rocks were pecked in back of them (Figs. 12, 16, 18). Retaining walls with arches and buttresses where the foundation was difficult and the ground was solid only in isolated places. The buttresses having very little effect, as they do not protrude very far beyond the outer face of the wall, this kind of wall was abandoned and used but once near Arnsberg (Fig. 13).

Cuts were made with either 1:1 or 1.5:1 slopes (Figs. 8 and 9) or vertical in solid rock; in this case the lateral ditches were widened to protect the road from falling rocks. In regions of heavy snowfall, ditches from 6'-10' deep and wide were dug. Retaining walls in cuts are mostly built of masonry in mortar, rarely of dry masonry (Figs. 13, 14 and 15). Protection of the slopes against the river current was either obtained by pavement with a slope of 1.5:1, or by rip-rap with 1:1 slope. In front of these are loose stones piled up to high-water



DETAILS OF RAILROAD CONSTRUCTION IN MOUNTAINOUS REGIONS.

mark, and with a berm 6 feet wide. (Figs. 17 and 17^a.)

The tunnels on the valley divisions were built for one track; in the mountain divisions for two tracks. The portals of the tunnels are built in a very unpretentious manner; in loose, sliding ground they were strengthened by strong buttresses.

Culverts are mostly made of arches in masonry, their bottom having a continuous grade;

when very steep, the lower part is supported by heavy buttresses. (Figs. 20 and 20^a.)

Where avalanches and torrents had to be passed under, strong and capacious aqueducts were built. Viaducts were used to cross rivers and on steep slopes where sustaining walls would be too expensive; the arches vary from 26' to 40' span. Larger viaducts were built of iron girders with stone piers.

The iron bridges are of the usual European

construction. The track-ties are all oressoted. The rails are of steel, 74 pounds per yard. The gravel-bed is from 1.3' to 1.64' thick. The stations are from 3 to 5 miles apart. The rolling-stock consisted at the time of opening of the road to commerce of 61 locomotives, 127 passenger cars, lighted by gas, and 538 freight cars.

The road was built in several sections by different contractors, they being paid by the

unit of quantities. The bids were from 7 to 23 per cent below the company's estimate, and still all the contractors—except L. Favre of the great tunnel—made money.

The lumber-mills of Joseph Enright in Shasta county are to be connected with the California & Oregon Railroad at Anderson by a broad-line system, 16 miles long. He is in Sacramento buying rolling-stock.

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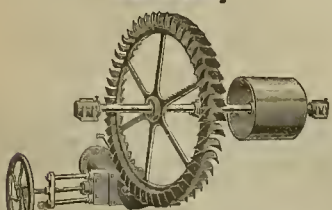
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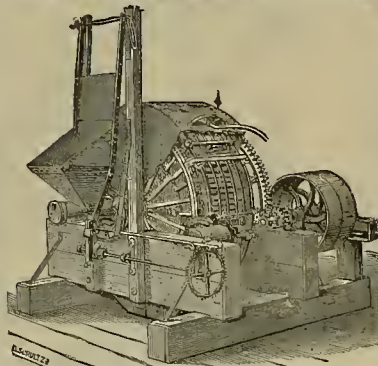
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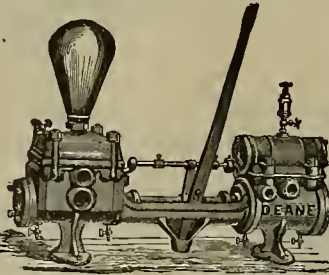
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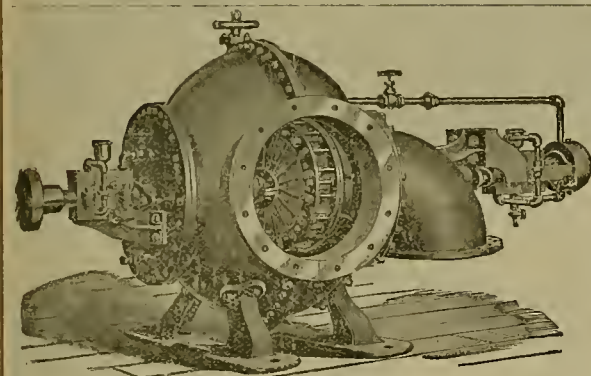
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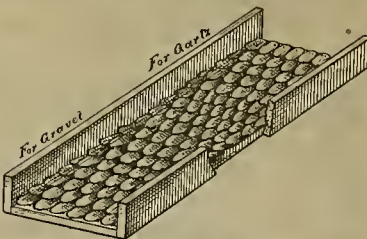
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List of U. S. Patents for Pacific Coast Inventors.

The following brief list by telegraph, for Jan. 14 will appear more complete on receipt of mail advice:

* California—Clarence V. Greenaway, bench clamp for pipe tongs and wrenches; also, adjustable pipe wrench; Lionel Heynemann, cable street railway; Peter S. Jackson, lengthening metallic beams; Jose Jardino, clearing apparatus; Edward G. King, compass attachment for field glasses; Edward M. Knight, titer; Patrick Noble, cable, railway; George A. Williams, coffee-pot; all of San Francisco, Daniel B. Baker, sash, San Jacinto; Dan Carl M. Baldwin, seedling machine, Florence; Louis P. Carl, tether pin, Peris; Alfred Dugden, knife sharpener, Santa Barbara; Willis D. Etzel, train fare punch, San Jose; John J. Cozer, whitetree coupler, Los Angeles; James Lyman, globe, San Jose; James R. Phelps, spreader for galting horses, Sacramento.

Oregon—Horace T. Currie, rail-cleaning and lubricating attachment for locomotive, Albina; Albert M. Grubbs, railway switch, Forest Grove.

Washington—David H. McFall, carpet-stretcher, Ellensburg.

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Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FLY-BOOKS.—John S. Beno, S. F. No. 444,272. Dated Jan. 6, 1891. Ordinary fly-books for carrying the artificial flies, used by fishermen, are composed of leaves of parchment and of flannel. The parchment leaves are usually arranged with two or more transverse pockets into which the looped ends of the snells or guts of the fly-books are tucked so as to keep them in place, or else the fly-books themselves are tucked in these pockets, leaving the gut ends projecting. In one case the patterns of the flies are concealed and the hooks have to be withdrawn for examination, and in the other case, where the hooks project, they are apt to become entangled. These fly-books are also often provided with ordinary parchment envelopes with a single flap bound in as leaves. Other forms of books are made, most of them more or less bulky, since to carry any considerable number of artificial flies, a large number of leaves must be used. Mr. Beno's new book has removable pocketed leaves or envelopes of peculiar construction so fitted in as to be readily examined and opened. The varieties of flies are readily accessible, while at the same time a large number can be carried in a small space. Each variety can be kept separate in its separate receptacle, and by indexing and numbering only the envelope desired need be opened and examined. In this case a book, a gross of flies, may be carried in small compass, each variety by itself, with no liability of being mixed. A rubber or strap lifts up the whole bunch of envelopes for examination, when the selection desired can be made. Many of our local anglers pronounce this book of Mr. Beno's the most convenient one on the market.

DERRICK.—Doctor F. Oliver, Oakland, No. 444,367. Dated Jan. 6, 1891. This hay-stacking derrick is a simple and well-balanced device adapted to be readily transported, and which, by reason of its peculiar boom, is adapted to deposit the load upon any part of the stack desired.

SCREEN.—Alexander A. Palm, Calico, San Bernardino Co., Cal. No. 444,252. Dated Jan. 6, 1891. This is a screen for coal or ore, of the kind generally known as a grizzly. The relative arrangement of the bars is peculiar, and is such that a piece of material coming down the bar of an upper section will find the opening in the next section directly in its path, so there is no danger of a piece that can be screened passing down upon the bars the whole length of the grizzly. The bars are tapered, so the spaces between them are wider at the lower ends than the upper, which avoids clogging or wedging and insures proper discharge. This result is further insured by the tapering shape in cross-section of the bars.

Coal and Coke.

SPOT FROM YARD—PER TON.	TO LOAD—PER TON.
Wellington.....\$12 00	Australian.....\$7 75
Greta.....	Liverpool Stm.....8 00
Carbon Hill.....	Scotch Splint.....8 00
Nanaimo.....	Cardiff.....8 00
Gilman.....	Lehigh Lump.....16 00
Seattle.....	Cumberland bk.....13 50
Coke Bay.....	0 00
Camel.....	14 00
Egg, hard.....	16 00
Cumberland, in sacks.....	15 00
do, bulk.....	18 00
Walstead.....	13 00

Coke—English.

Eastern Metal Markets.

By Telegraph.

New York, January 14.—The following are the closing prices the past week:

	Silver in Silver	Lead	Tin.
Thursday.....	48 1/2	14 00	4 00
Friday.....	48 1/2	14 00	4 00
Saturday.....	48 1/2	14 00	4 00
Sunday.....	48 1/2	14 00	4 00
Monday.....	48 1/2	14 00	4 00
Tuesday.....	48 1/2	14 00	4 00
Wednesday.....	48 1/2	14 00	4 00

Borax is slightly easier. Lead has been steadily advancing under a firmer demand. Copper shows a steadier tone. Tin fluctuates slightly. The demand is slow.

MINING DECISION.—The Register and Resolver at Reading have decided the cases of the Santa Rosa Quartz Mine and the Grand Central Quartz Mine vs. The State of California in favor of the mines and against the State. The mines are situated in Sec. 16, T. 31 N., R. 6 W., Shasta county, near Igo. The Black Prince mine is situated in the same section. E. A. Belcher, the mining attorney of San Francisco, represented the mineral claimants. The State is allowed 30 days to appeal to the Commissioner of the General Land Office.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, Jan. 15, 1891.

The general situation among manufacturers and merchants is about as heretofore reported. Crop prospects are of the best. The only drawback to the favorable condition of affairs is the light deposit of snow on the mountain ranges; but there is ample time for a large fall before the rainy season has passed. The local money market is steadily growing easier.

MEXICAN DOLLARS.—The market is quiet but from firm 82 1/2 to 83 cts.

SILVER.—Department purchases in this month are as follows:

Date	Offered ounces.	Purchased ounces.	Price paid per ounce.
January 2.....	932,000	807,000	\$1.0450 to \$1.0525
January 6.....	1,330,500	672,000	1.0550 to 1.0480
January 7.....	1,350,000	625,000	1.0492 to 1.0529
January 9.....	1,020,000	754,000	1.0510 to 1.0524
January 12.....	593,800	283,000	1.0525 to 1.0700
January 14.....	918,000	455,000	1.0585 to 1.0620
Total.....		3,499,000	

With only half of the month passed, nearly the full quota of silver required to be purchased has been secured. The market has exhibited more life at the East, which is accepted by operators as indicating that speculators are at work. The annual report of Wells, Fargo & Co. gives the output on this coast at over 2,000,000 ounces less in 1890 than it was in 1889. The San Francisco Stock and Bond Exchange has listed silver bullion as a speculative commodity, to be dealt in the same way as are other securities listed by the Exchange. The passing by the United States Senate of a pure, unadulterated free-coinage bill has not, as yet, had any effect on the market. This, no doubt, is due to fears entertained that the House of Representatives will not accept the Senate bill. It may be that the growing fear of free coinage has possibly had the effect to convert a sufficient number of gold-bug Congressmen to bimetallicism to give the latter a majority in the House.

QUICKSILVER.—Receipts the past week aggregate 223 flasks. The market has sunk to still lower figures. The demand is good for the season.

ANTIMONY.—The market is barely steady. The East reports an easy tone.

BORAX.—Receipts the past week aggregate 223 casks. The market is quiet but steady. Eastern advices indicate a better consumptive demand in the near future.

LIME.—Receipts aggregate 2950 bbls. The demand is only fair.

IRON.—The market is quiet but steady. English advices report a stronger tone. At the East it is claimed that concessions are easier to get from first hands. This is said to be due to large producers crowding the smaller concerns into suspension. The Alabama furnaces are likely to go out of blast in the near future, which if done will lessen production fully 120,000 tons a month.

COPPER.—A shipment of 804,665 lbs. of matte was made the past week to New York. The market is barely steady. The Eastern markets report buyers and sellers somewhat apart. Arizona ingots are obtainable as low as 13 1/2 to 13 3/4 cts., and casting brands at 12 1/2 cts.

TIN.—The market is barely steady for pig. Plate is firm, with a fair inquiry. In New York, plate is higher and active. English cables, report a strong active market for plate for the United States, anticipating the duty which goes into effect on July 1st.

COAL.—Imports the past week aggregate as follows: Seattle, 2907 tons; Coos Bay, 1575; Nanaimo, 3678; Departure Bay, 1227. Total, 119,387 tons. The market is easy for coast. It is claimed that Seattle is obtainable at \$8, but this, too, fails to have confirmation. Dealers buy sparingly, under the impression that lower prices will obtain soon. With continued good crop prospects on this coast, more tonnage will head this way.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, January 15, 1891.

ANTIMONY.....	— @ 20
BORAX—Refined, in carload lots.....	8 @ —
Powdered.....	8 @ —
Concentrated.....	7 1/2 @ —
COPPER.....	
Boat.....	23 @ —
Sheeting.....	23 @ —
Ingots, jobbing.....	18 @ —
do, wholesale.....	16 @ —
Fire Box Sheets.....	23 @ 25
LEAD—Pig.....	5 1/2 @ —
Sheet.....	5 1/2 @ 63
Pipe.....	5 1/2 @ —
Shot, discount 10% on 500 bags Drop, 1/2 bag.....	1 80 @ —
Buck, 1/2 has.....	2 10 @ —
Chilled, do.....	2 10 @ —
Flasks, old.....	4 @ 55
CHROME IRON ORE, 1/2 ton.....	10 @ —
STEEL—English, 1/2 ton.....	16 @ 20
Trunking—E. V., steel grade, 1 1/2 x 20, to arrive.....	6 3/4 @ 60
B. V., steel grade, 1 1/2 x 20, spot.....	6 3/4 @ —
Charcoal, 1 1/2 x 20.....	6 50 @ —
do, roofing, 1 1/2 x 20.....	6 00 @ —
do, do, 2 1/2 x 20, nominal.....	13 00 @ —
Pig, 1/2 ton, spot.....	22 @ 22 1/2
IRON—Bar, base.....	3 @ —
Norway, base.....	4 1/2 @ 54
IRON—Glengarnock ton.....	34 @ —
Eglinton, ton.....	34 @ —
American Soft, No. 1, ton.....	33 @ —
Oregon Pig, ton.....	33 @ —
Pugot Sound.....	34 @ —
Clay Lumps.....	25 @ —
Shots, No. 1.....	34 @ 38 00
Langlois.....	34 @ —
Thorndike.....	34 @ —
Gardner.....	34 @ —
Barrow.....	34 @ —
Carzfoot.....	30 @ —

THE MINING BUREAU REPORT.—We received this week, too late for extended review, the report of State Mineralogist Irelan. It will receive attention in next week's PRESS.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY.	LOCATION.	No.	AM'T. LEVIED.	DELINQ'T.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Adelaide Copper Co.....	Nevada.....	2.....	6, Dec 27.....	Jan 31.....	Feb 28.....	W. H. Graves.....	426 Sansome St
Atlantic Con M Co.....	Nevada.....	7.....	25, Nov 19.....	Jan 29.....	Feb 19.....	D. M. Kent.....	330 Pine St
Brunswick Con G M Co.....	California.....	1.....	2, Jan 9.....	Feb 10.....	Mar 6.....	J. Stadfeldt.....	309 Montgomery St
Con Imperial M Co.....	Nevada.....	30.....	5, Dec 13.....	Jan 16.....	Feb 9.....	O. L. McCoy.....	331 Pine St
Con St Gothard M Co.....	California.....	2.....	10, Dec 9.....	Jan 15.....	Feb 7.....	T. Wetzel.....	320 Sansome St
Contra Estancia Mex M Co.....	Nevada.....	1.....	60, Dec 15.....	Feb 15.....	Apr 4.....	George Gale.....	309 Montgomery St
Crown Point M Co.....	Nevada.....	53.....	50, Dec 3.....	Jan 7.....	Jan 24.....	James Newlands.....	331 Pine St
Del Monte M Co.....	Nevada.....	4.....	10, Jan 6.....	Feb 9.....	Mar 3.....	J. W. Pew.....	310 Pine St
Elchequer M Co.....	Nevada.....	30.....	25, Dec 9.....	Jan 15.....	Feb 5.....	O. E. Elliott.....	309 Montgomery St
Gray Eagle M Co.....	California.....	21.....	3, Dec 20.....	Jan 26.....	Feb 16.....	A. W. Barrows.....	303 California St
Granddalupe M Co.....	California.....	3.....	10, Jan 16.....	Feb 20.....	Mar 11.....	F. Schetter.....	336 Clay St
Hale & Norcross M Co.....	Nevada.....	37.....	50, Jan 7.....	Feb 11.....	Mar 4.....	A. B. Thompson.....	309 Montgomery St
Head Centre & Tranquillity M Co.....	Ariz.....	11.....	5, Dec 11.....	Jan 16.....	Feb 9.....	J. W. Pew.....	310 Pine St
Inyo Marble Co.....	California.....	11.....	10, Dec 16.....	Jan 30.....	Feb 20.....	G. W. Luce.....	132 California St
Kentuck M Co.....	Nevada.....	23.....	35, Dec 23.....	Feb 3.....	Feb 25.....	J. W. Pew.....	310 Pine St
Leigh Gravel M Co.....	California.....	2.....	5, Nov 22.....	Jan 3.....	Jan 24.....	E. E. Hall.....	320 Sansome St
North Gould & Curry G S M Co.....	Nevada.....	12.....	20, Jan 10.....	Feb 11.....	Feb 23.....	C. H. Mason.....	331 Montgomery St
Northwestern G S M Co.....	Br. Columbia.....	1.....	5, Nov 12.....	Jan 19.....	Feb 9.....	F. Bonacina.....	435 California St
Oak Con M Co.....	Nevada.....	7.....	4, Dec 18.....	Feb 2.....	Mar 2.....	E. J. Ryan.....	230 Montgomery St
Potosi M Co.....	Nevada.....	35.....	15, Dec 16.....	Jan 20.....	Feb 10.....	C. E. Elliott.....	309 Montgomery St
Quaker M Co.....	California.....	1.....	15, Dec 3.....	Feb 2.....	Feb 24.....	A. Chemnitz.....	328 Montgomery St
Riverside M & M Co.....	California.....	1.....	10, Dec 11.....	Jan 12.....	Feb 2.....	J. Stadfeldt.....	309 Montgomery St
Sierra Nevada S M Co.....	Nevada.....	98.....	30, Jan 2.....	Feb 5.....	Feb 24.....	E. L. Parker.....	309 Montgomery St
Terracon M Co.....	California.....	6.....	1, Dec 6.....	Jan 8.....	Feb 9.....	W. J. Gunnert.....	308 Pine St
Union Con S M Co.....	Nevada.....	42.....	25, Jan 5.....	Feb 10.....	Mar 2.....	A. W. Barrows.....	303 California St
Utah Con M Co.....	Nevada.....	11.....	25, Dec 9.....	Jan 19.....	Feb 9.....	A. H. Fish.....	Nevada Block

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Belcher S M Co.....	Nevada.....	C. L. Perkins.....	327 Pine St.....	Annual.....	Jan 27
Cibola Creek M Co.....	California.....	L. Osborn.....	.....	Annual.....	Feb 2
Crescent M & M Co.....	California.....	J. H. Isham.....	310 Pine St.....	Annual.....	Jan 19
Crocker M Co.....	Arizona.....	N. T. Messer.....	309 Montgomery St.....	Annual.....	Jan 19
Del Monte M Co.....	Nevada.....	J. W. Pew.....	310 Pine St.....	Annual.....	Jan 23
Head Centre M Co.....	Ariz.....	J. W. Pew.....	310 Pine St.....	Annual.....	Jan 23
Lion Star G & G M Co.....	California.....	A. W. Blundell.....	2314 California St.....	Annual.....	Jan 17
Quaker G M Co.....	California.....	A. Chemnitz.....	328 Montgomery St.....	Annual.....	Jan 24
North Commonwealth M Co.....	Nevada.....	J. W. Pew.....	310 Pine St.....	Annual.....	Jan 27
Northwestern G S M Co.....	Br. Columbia.....	F. Bonacina.....	435 California St.....	Annual.....	Feb 2
Sierra Nevada S M Co.....	Nevada.....	E. L. Parker.....	309 Montgomery St.....	Annual.....	Jan 21
Sulphur Bank Quicksilver M Co.....	Cal.....	T. Winttingham.....	306 California St.....	Annual.....	Jan 19
Utah Con M Co.....	Nevada.....	A. H. Fish.....	309 Montgomery St.....	Annual.....	Jan 28

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Candelaria Cons M Co.....	New Mexico.....	G. Gale.....	309 Montgomery St.....	25.....	Dec 3
Commonwealth M Co.....	Nevada.....	R. R. Grayson.....	331 Pine St.....	20.....	Nov 20
Eureka Cons M Co.....	Nevada.....	H. P. Bush.....	309 Montgomery St.....	25.....	Aug 6
Pacific Coast Borax Co.....	California.....	A. H. Clough.....	230 Montgomery St.....	1 00.....	Jan 10

Mining Share Market.

Minio shares the past week were quite active at fluctuating but upward prices. The moves are different from those made in former manipulations, which give color to a well-grounded belief that a new general is at the helm. The changes in the personnel of those who do the outward work have been so quiet as to not attract undue notice from the few remaining outside dealers willing to be bled. The action of the market warrants the assertion that prices will go still higher, so as to peddle out stocks probably for assessment purposes. As yet the outside public is not over-sanguine, and when it buys it is generally for a "chip." Until manipulators get the confidence of the outsiders, so as to get them loaded up, we can continue to look for an active trading market. They may even resort to the old dodge of showing up ore in one of the mines so as to induce outsiders to buy stocks. The conditions are favorable for unloading at a good profit. The work in the mines is of a very important character and almost entirely prospecting. There is every indication that silver will be remonetized by the present Congress, while the money markets of the world are easing up, and with cheaper money, speculations are fostered.

Since the second day of the present month, Con. Virginia and Gould and Curry more than doubled in price, although at the close they have receded from their highest figures. Other stocks also sold at higher figures. By reference to the highest and lowest prices for the week, this can be verified. Our list is compiled from the official sales of the Board published by Goldstein & Co.

It is reported in usually well-informed stock circles that there has been some crooked work in the management of one or more of the Gold Hill mines. Those who place credence in the report say that the books and accounts in the offices are honestly kept, but it is at the mines and mills where the leaks are claimed to be done. Why do not the companies conform to the laws of this State and give the lie to these reports, provided the mines are honestly worked, and the ore honestly mined?

News from the Comstock mines is that the strike in Gould and Curry is likely to prove more valuable than was at first supposed by well-informed miners. The strike in Con. Virginia on the 1600-foot level "way to the west" is of an important character, and when further developed it is likely that the battery assays of ore milled will show a decided increase. In Savage, Hale and Norcross and Chollar, favorable results are confidently looked for from the active prospecting work now under way. In the Potosi workings another improvement is reported toward the Bullion line. Our advices from the Gold Hill mines report important work, which is not even hinted at in official letters from the superintendents. Whether private letters to officials in this city contain the information, we are not able to learn. In Con. Imperial, Confidence and Challenge, high-grade ore is being taken out or laid to one side for future milling. This is probably done in order to give a more plausible excuse for assessing the stock. In Belcher, Seg. Belcher, Overman, Crown Point and Yellow Jacket, the work is being watched with deserved interest by the more prominent mining men. From the outside mines, the news is confirmatory of what we have heretofore given. Confidence is expressed that the spring months will witness a very general revival in all outside districts.

The market opened this morning to lower figures, but strengthened slightly after Call under an up move in Savage. News received to-day reports continued improvement in the Savage winze, and that in an east drift run from the winze they were in rich ore. This indicates a large development in the mine. From Hale and Norcross, private information is also of an important character.

At the annual meeting of the Mining Stock Association the following officers were elected to serve for the incoming year: Dr. W. H. Griswold, president; Major Frank Mann, vice-president; John Tingman, secretary; Col. Dean, treasurer. The attendance was large, and considerable enthusiasm was manifested at the prospective changes in mine managements for the better.

THE output of the Roslyn mine of Kittitas county, Wash., for 1890 was 450,669 tons, against 238,431 tons in 1889. The payrolls for many months called for \$80,000 a month.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Dec. 24.	WEEK ENDING Dec. 31.	WEEK ENDING Jan. 8.	WEEK ENDING Jan. 15.
Alpha.....	.75	.90	.75	.95
Alta.....	.60	.75	.65	.75
Andes.....	.51	.70	.65	.80
Belcher.....	1.25	1.45	1.20	1.35
Best & Belcher.....	1.90	2.10	1.85	2.25
Bullion.....	1.55	2.00	1.85	2.25
Bodie Con.....	.65	.90	.70	.95
Butler.....	.15	..	..	..
Commonwealth.....	.75	..	.26	..
Con. Va. & Cal.....	2.60	2.70	2.55	3.10
Challenge.....	1.50	1.60	1.55	1.65
Chollar.....	2.05	2.40	1.9	2.3
Confidence.....	4.90	5.25	4.75	5.00
Con. Imperial.....	..	..	..	..
Caledonia.....	.30	.35	.30	.35
Crown Point.....	1.10	1.20	1.10	1.25
Crocker.....	..	.15	..	.25
Del Monte.....	..	..	.16	..
Eureka Con.....	..	..	..	.40
Excelsior.....	.40	.50	.40	.50
Grand Prize.....	.15	.20	..	.20
Gould & Curry.....	1.15	1.30	1.25	1.45
Hale & Norcross.....	1.15	1.45	1.35	1.60
Julia.....	.15	.20	.15	.20
Justice.....	.85	.90	.90	1.10
Kentuck.....	.85	1.05	.78	.85
Lady Wash.....	..	..	.20	.16
Mono.....	.40	.45	.40	.45
Mexican.....	2.10	2.35	2.05	2.30
Nevada.....	..	.15	.20	..
Norjo.....	..	..	.65	.70
North Belle Isle.....	.70	.75	.75	.85
Occidental.....	.75	.85	.70	.75
Ophir.....	2.65	2.90	2.50	3.70
Overman.....	1.70	1.80	1.80	1.65
Potosi.....	3.90	4.40	3.55	4.60
Verde.....	.10	..	..	..
Pearl.....	.10	.15	.15	.20
Savage.....	1.55	1.75	1.60	1.65
S. R. & M.....	.80	.90	.75	.80
Sierrita.....	1.50	1.65	1.55	1.60
Silver Hill.....	.20	.25	.20	.25
Scorpion.....	..	.10	..	.15
Union Con.....	1.55	1.65	1.60	1.70
Utah.....	.35	.45	.40	.45
Verde.....	1.30	1.60	1.50	1.65

* Collecting assessment.

WM. H. TAYLOR, President.

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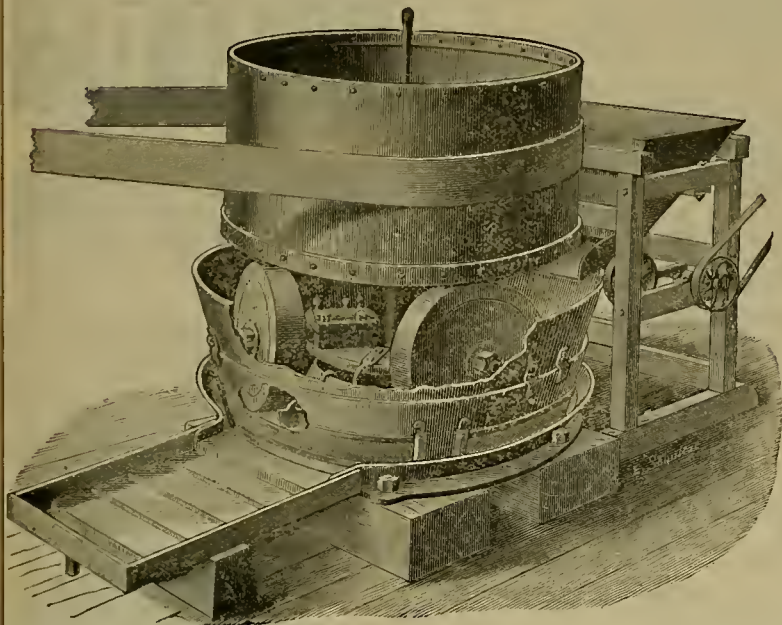
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- One (1) 4" x 6" Jack Head Pump.
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- One (1) 10" x 36" Retort and Furnace.
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- One (1) Batea.
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Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

Assessment Notices.

GRAY EAGLE MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Placer County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 26th day of December, 1890, an assessment, No. 21, of Three (3) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 33 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 26th day of January, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 16th day of February, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
A. W. BARROWS, Secretary pro tem.
Office, Room 11, No. 303, California Street, San Francisco, California.

INYO MARBLE COMPANY.—LOCATION of principal place of business, San Francisco, California. Location of works, Keeler, Inyo County, California.

Notice is hereby given, that at a meeting of the Board of Directors held on the 16th day of December, 1890, an assessment (No. 1), of Ten Cents per share was levied upon the capital stock of the Corporation, payable immediately in United States gold coin, to the Secretary at the office of the Company, 132 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 30th day of January, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 20th day of February, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
G. W. LUCE, Secretary.
Office, 132 California Street, San Francisco, California.

MINING

— AND —

Ore Dressing Machinery.

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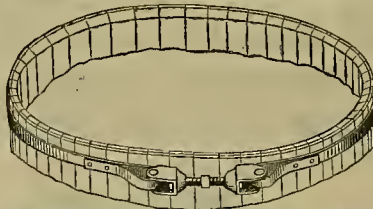
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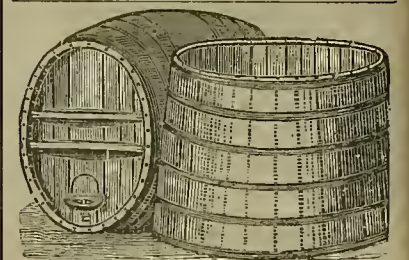
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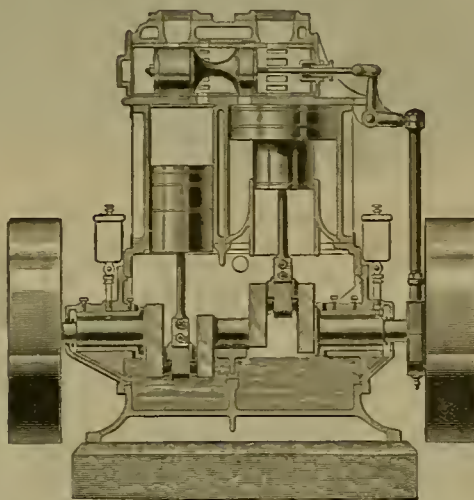
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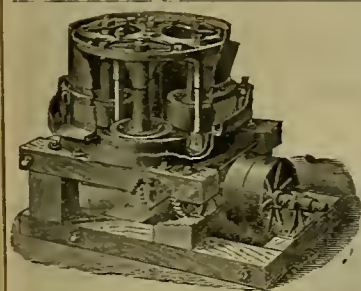
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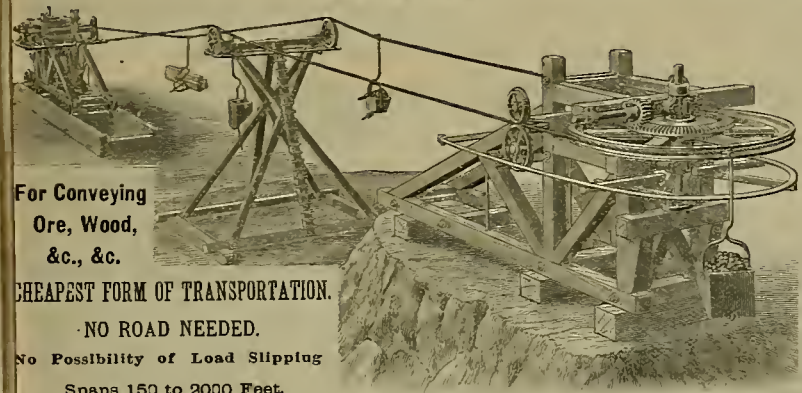
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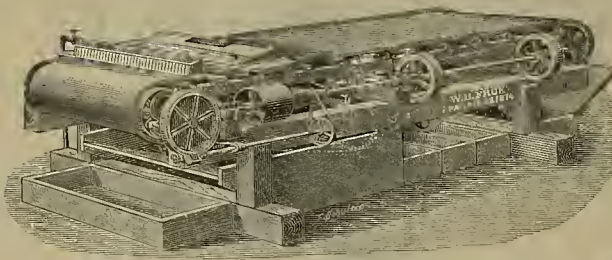
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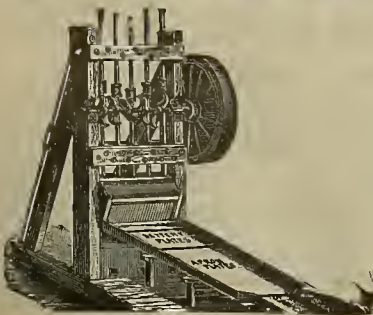
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Since that time they have acquired by purchase the Harris and Lloyd tunnel properties, consisting of three full claims, and the West Colusa and the Clarke smelter, all desirable property and lying contiguous to their properties. Explorations have been carried on with such vim and energy that they at the present time have many years' supply of ore in sight for a much larger plant than they are now operating. The Mountain View shaft is 1000 feet in depth, with stations at each 100 feet, crosscuts and levels run, opening up the ore body.

The Colusa is 800 feet, West Colusa 500 feet, Lloyd & Harris 400 feet in depth. With all of these properties opened and all of the preparatory work done, the company are in a fine position to keep the shipments of copper matte up to their present proportions for many years. They are at present building smelting works at Great Falls capable of handling 1000 tons daily, and have their contracts made with the Great Northern railway to transport that amount for them. When this is completed, it will increase their output very largely, as at the present time their reduction facilities will only handle about 450 tons daily. Their works at Great Falls bring them convenient to the Land Conlee coal-fields, and their power costs them comparatively nothing. This will more than stand off the expense of transportation,

and in building the new reduction works every advantage that can be taken to reduce the cost of handling will be used. When complete, the Boston & Montana Company's smelter at Great Falls will be a model of convenience for the production of copper matte; it will increase their product to about 75,000,000 pounds of refined copper per annum, and their silver to the value of 1,000,000 ounces.

This estimate is based on the statement from the company's books of the product for the three years previous to June 30, '90, which were as follows:

	Refined Copper.	Oz. Silver.
Product for year ending June 30, 1888.....	8,815,987	None.
Product for year ending June 30, 1889.....	24,204,844	152,993
Product for year ending June 30, 1890.....	26,014,120	284,542

Taking this for a basis and the present price of silver and copper, when their plant at Great Falls is completed and in operation, the B. & M. Company's yearly product will approximate \$10,000,000. This may have the appearance of applying the old adage of "counting chickens before they are hatched," but the only chances to be taken in this estimate are the ruling prices of the red and white metals.

The shafts on all of their properties are furnished with the finest engines and hoists that have been erected in the camp, and are of sufficient size to sink to the 2000-foot level should that ever become a necessity.

One of the best indications that a mine is being operated with a handsome profit is to see their hoisting works and shaft-houses (see engravings) in complete order and all the safety appliances that can be obtained in place.

The employees of the Boston & Montana Co. number nearly 1000 men in mines and reduction works, and as nearly all live in the vicinity of Meaderville, they make a happy, contented community.

Among their number they have the finest band in the State of Montana—all miners working with the company. It is known as the Boston and Montana Band.

The superintendent, Thos. Couch, made them a present of a fine large hospital building, amply large for all demands likely to be made upon it. This is kept up by the usual hospital tax of one dollar per month deducted from each employe, and a guarantee of care and comfortable quarters when, through sickness or accident, they may require it. The officers of the company are at present: President, Jos. W. Clarke, of Boston; Secretary and Treasurer, Albert S. Bigelow; General Manager, Thos. Couch, of Butte; and the smooth manner the B. & M. Co.'s works are carried along is due to their careful direction of affairs.

Thomas Couch, the general manager, on

[Continued on page 56.]



HOISTING WORKS ON THE MOUNTAIN VIEW, BOSTON AND MONTANA COMPANY.



UPPER SMELTER OF THE BOSTON AND MONTANA MINES.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

New Mexican Mines.

EDITORS PRESS:—I have sent you no report from this camp for a long time, because there was nothing of special moment to report. With the closing weeks of the old year, however, the camp has taken a new start and is now progressing very rapidly indeed.

In November, Wm. Watson, one of the owners of the property known as the "Old Abe," made discovery of the lead. Mr. Watson had worked upon the property for more than ten years. Many discoveries of rich ore had been made, but in none was there any important lead or any paying quantity of ore. Finally upon a grassy slope, near the "Old Abe" gulch, right under the grass roots, he came upon the apex of the true fissure quartz vein for which he looked in vain so many years. At the surface it was about 18 inches wide. Mr. Watson instantly commenced sinking. The lead steadily increased in width and promise. At a depth of 35 feet it had put 50 tons of ore on the dump, and the owners leased the Glass 10-stamp mill east of town. The trial run cleaned up about 46 tons of rock which contained some surface dirt and water. The result was \$33.50 per ton. The mill started immediately after the cleanup on regular crushing work for an indefinite period. At 80 feet of depth the lead shows five feet of fine quartz ore, at least as rich as the first millrun, and produces ore at least as fast as the old mill can crush it. The lead has now been traced several hundred feet, apparently maintains its value so far as traced, and another permanent producer has undoubtedly been added to the old resources of the camp. The property is under the personal management of the owners and will be worked for what there is in it and for all it is worth. Better still, a large majority of the ownership is in the camp, and the profits will consequently stay here for investment.

In November, B. H. Dye, co-owner of the Lady Godiva, resumed work upon the 450 level, drifting north on the No. 1 vein. On Christmas eve he struck the south edge of the great ore chute which is known to extend to the surface. The ore is a very rich black-and-white quartz, of which there is now between three and four feet. Milling operations upon this ore body will begin shortly, and still another permanent producer will result from Dye's persistent work.

Both of these new producers lie upon "East Baxter" mountain. The ores of this section of the mountain are quartz and the ores are found in fissure veins and are of exceptionally high grade. The ores of West Baxter are usually porphyritic or granitoid, can hardly be called "veins," and are of much lower average grade.

The North Homestake, for the past four years the property of James M. Sigafrio et al of Tarrytown, N. Y., has been worked in a small way to supply a mill of two five-foot Huntington centrifugal machines.

There has been a slow but steady development until the Solitaire shaft on the property has attained a depth of 960 feet. (By the way, by several hundred feet the deepest work in New Mexico.) At that depth 30,000 tons of ore are in sight upon a very conservative estimate. Upon this showing the property has been sold to Chicago and New Mexican parties for \$250,000. The purchasers will take possession, it is understood, on the 15th inst. The purchase was negotiated by John A. Miller, Esq., of Silver City, N. M., well known in the mining world on account of his successful operations at Lake Valley, Pinos Altos, Cooney, Carlisle and elsewhere. Mr. Miller is personally interested in the purchase, and will, it is understood, be for a time at least the manager of the property.

Mr. Miller is a man of wide experience in New Mexican mining, having been a resident of the Territory for 25 years. He is of abundant energy and push, and I risk nothing in saying that the North Homestake property under his management will be worked for all it is worth. The purchasers contemplate very large additions to the equipment of the mine; the use of a much larger compressor plant than that now in use; a new mill equal to at least a hundred tons a day, and other additions to their facilities for the rapid extraction and economical treatment of their ores.

All these developments have energized the camp (very dull for the past two years) and the good effects are already perceptible.

Developments proceed in the Jicarilla camp, eight miles north of us, with very promising results. That camp cannot, however, prosper until the introduction of capital. Rola Wells is at work upon his Helen Roe mine in Nogal district, 20 miles south. From the level being run each way from the 140-foot shaft at a depth of 50 feet, nothing but ore is taken out, and that of a very high grade.

Near Tres Rios, 35 miles south of us, very rich silver ore has been found upon the Mesalero Apache reservation, on which considerable quiet work is being done. Petitions for the reduction of the reservation by the two townships involved in the new mining discoveries, have been sent on to Washington. The

application will probably be successful, as they will meet with no opposition from this domestic and thoroughly peaceable tribe of Indians. The Mesaleros make no use of the portion of the reservation desired for mining purposes, and care for no parts of the reserve except those used by them in farming and for the grazing of their cattle. In fact, the most influential portion of this tribe desire to obtain lands in severalty, abandon the reservation system, and thus insure their own permanence in the country in which they reside and which has become dear to them. The year 1891 will, I have no doubt, develop in the Tres Rios region a valuable silver camp, to the great benefit of the surrounding country. The silver ores so far exposed in the new camp are of a grade which will stand the necessary wagon transportation of 100 miles to railroad.

White Oaks, N. M., Jan. 10, 1891.

Mines Around Daggett.

EDITORS PRESS:—We are having cold raw winds but no snow in this vicinity. Recently one-third interest was sold for \$5000 in the McShane mine to the Barber Milling Co. of Calico. A claim on Stockton hill, near Kingman, has also been sold to Robert Whiteside of Los Angeles for \$9000. Some mines down here are progressing in development more than ever before, especially those accessible to railroads. We have, however, little confidence in tenderfoot speculators who will not risk more than \$500 to test a mine. They prefer cheap claims and seem to want such as can be handled in the Stock Boards. We would like to see some bona fide mining investors in this part of the country who will pay for a good mine when they see it.

S. P. BLADE.
Daggett, San Bernardino Co.

Coast Coals.

J. W. Harrison furnishes the following review of the local coal market for the past year:

This has proved a very profitable year to all engaged in this trade, especially to the owners of the coast collieries, as the ruling figures for the past six months have left them a very handsome margin over the cost of production. To evidence how marked have been the fluctuations during the year, spot cargoes of Australian coal changed hands in January last at \$6.75 per ton, some cargoes of a similar grade were sold last month at \$11.50 per ton, and only a limited quantity was procurable at that figure. These exceptionally high figures were not the result of any combination or trust among the dealers—simply the demands exceeded the supplies. From May 15th to September 10th no coal was shipped from the Wellington mine, and from August 25th to November 10th no cargoes were loaded in Australia. With these two principal sources of supply cut off, and at a season of the year when most in demand, the increase of values can be readily explained. The labor troubles having been amicably settled, shipments are now coming forward freely and values are declining, English and Australian cargoes being offered at lower rates for future delivery.

The following table of prices will show the monthly fluctuations of foreign coals for "spot" cargoes—the average price being given for each month:

	Australian	English	Scottish	West
	Gas.	Steam.	Flint.	Harley.
January.....	\$6.75	\$8.00	\$8.50	\$9.00
February.....	6.75	7.75	7.75	8.50
March.....	7.12	7.62	8.00	8.50
April.....	7.50	7.75	8.00	8.50
May.....	7.50	7.75	8.00	8.50
June.....	7.62	7.75	8.00	8.50
July.....	7.85	8.00	8.25	8.50
August.....	8.50	8.87	8.75	9.00
September.....	9.00	9.25	9.50	9.75
October.....	10.00	10.00	10.50	11.00
November.....	11.50	11.25	11.50	11.75
December.....	11.00	10.50	10.50	11.00

The various sources from which we have derived our supplies are as follows:

	1889.	1890.
British Columbia, tons.....	417,904	440,571
Australia.....	408,722	194,726
English and Welsh.....	32,890	33,145
Scottish.....	12,727	1,010
Eastern (Cumberland and Anthracite).....	18,950	31,950
Franklin, Green River and Cedar River.....	209,137	216,760
Carb n Hill and South Prairie.....	103,377	191,109
Mount Diablo and Coos Bay.....	57,000	74,226
Japan.....	1,340	13,170
Totals.....	1,351,957	1,197,250

To insure a correct statement of the consumption of the State, I have included all the arrivals at San Pedro, 70,954 tons, and San Diego, 52,358 tons.

As the freight from foreign ports is the principal factor in establishing coal values, it is a query how our market will shape itself in 1891. A seasonable rainfall, producing bountiful crops, assures us a large influx of vessels that will be principally coal-carriers. This, of course, signifies low-priced fuel, but the season is not sufficiently advanced as yet to hazard an opinion. Notwithstanding we are now receiving 75 per cent of our coal from our coast mines, the local agents of the northern collieries regulate their prices by the import cost of foreign grades.

The imports of foreign coals for the year amount to 18,309 tons, as against 21,624 tons last year.

San Bernardino County.

Its Mineral and Other Resources.

NUMBER XXVI.

(Written for the PRESS by JAMES H. CROSEMAN.)

Iron Mountain.

About ten miles in a southeasterly direction from Crystal Salt, an elevated mountain peak may be seen, the length of which is 12 miles and the width four. The formation is dolomite and porphyry. The name Iron Mountain was suggested by the deep red iron oxides which stain it, forming an iron hat of considerable extent, which can be plainly seen from a long distance. This forms the gossan or cap of a vein of copper ore of evident value, the ores carrying on an average about 38 per cent copper, 20 ounces silver and \$75 gold.

Chuckawalla Springs

Are eight miles distant from Iron Mountain in a northwesterly direction, and about 50 miles east of Salton, a station on the Southern Pacific railway in the desert regions. These springs are located in San Diego county, not far from the line of San Bernardino county. In their vicinity is an important mineral district in which lead-silver ores and gold-bearing rocks occur in strong, well-defined veins.

Assaya from the Nonpareil, one of the principal and most promising mines, give 50 per cent lead, 20 ounces silver and \$75 gold per ton. The vein, which is a contact between porphyry and lime, is about four feet in width.

The foothills of the Colorado river range have long been known to contain strong veins of copper ore of high grade. Leaving the eastern and northeastern portion of San Bernardino county, we enter the desert region in the vicinity of

Soda Lake.

A brief description of this interesting region cannot fail to be of interest. There is a tradition among the Pute Indians to the effect that during the time of their forefathers, what is now Soda Lake was at that time a vast sheet of water 20 miles long and 8 wide, which must have been fresh, as the legend says the waters teemed with fish. It is situated 500 feet above the level of the sea. There are times when this great natural reservoir is filled to the brim, particularly when heavy cloudbursts occur on the slopes of the neighboring mountains, and the waters rush in torrents down into the basin. Then the antebarricade channel or outlet is flushed and found too small to carry off the flood. So great is the pressure that the lake-bed becomes a veritable geyser, spouting mud and water violently. On the southwest side of the lake is a considerable area covered by sand-dunes, which region has been named in grim humor, the Devil's Playground or Hell's Half Acre. During the windstorms which frequent this section, millions of tons of sand are shifted in a great circle about 12 miles in diameter from one side of the lake to the other, the central portion of the area remaining seemingly undisturbed, covered by a snowy white crystallization of soda.

Along the west side of the lake for a distance of four miles, occur springs of pure water which flow down to the lake's margin, where the greedy sands allow up the streams. The largest spring flows from a fissure in the solid lime limestone which forms the bedrock of the region. The water from this spring flows about 18 miles before it is lost in the desert and. There are numerous other springs on the south-east side of the lake.

Soda Lake station is situated about 75 miles east of Daggett on the line of the old emigrant road from Salt Lake. Its mean temperature is about 80 degrees. To the northward, a deep, rugged canyon has been cut down into the limestone. Passing through this canyon we come to another dry basin, known as Crystal Lake. In its area is 60 miles, 12 long by 5 wide. This basin is filled at times, though rarely, by the overflow from the Mojave river.

Making our way through another pass for a distance of 12 miles, we reach the confluence of the Mojave and Amargosa rivers, where a spur of the Ivantuz mountains forms one of the river banks. On the westerly slope of this range occur the salt spring and Amargosa mine, which were discovered by John A. Golden in 1849, while on his way from St. Louis, Mo., with an emigrant train. It was this same train which divided at King's Springs in Nevada. It was from this circumstance that the sensational stories arose which have recently been published giving lengthy descriptions of the terrible sufferings and ultimate death of a hundred or more men, women and children in Death valley while endeavoring to cross the desert. The loss of life, though not near as great as reported, occurred with that portion of the train which Mr. Golden left. After leaving the main train in Nevada, he started with his own outfit for Los Angeles, California. Traveling down the Amargosa river, he camped one day at Salt Spring, and it was while here that he made his way up the mountain-side and found a piece of heavy black mineral. Not being familiar with it, but thinking it might possibly have value, he took it with him to camp, eventually taking it to Los Angeles, where he showed it to a number of gentlemen, who at once unhesitatingly pronounced it gold, covered with a black oxide of iron. He was offered \$5000 to guide a party to his discovery, to

which he consented, though it was with the distinct understanding that should he fail to show them his treasure-trove, or in the event of his becoming lost on the desert, his life should pay the forfeit. Mr. Golden readily consented, for he had every confidence in being able to guide his party directly to the spot.

A party was promptly formed and left Los Angeles to face the dangers of a reported unknown and terrible desert in search of the golden treasure. The hardy pioneer had no difficulty in finding Salt Springs, and went into camp at that place in high spirits; but his satisfaction at having reached his journey's end was soon turned to consternation when he was unable to find the place at which he had discovered the gold. He tried to keep the dreadful fact from his companions for a time, but they were after gold, and soon became so importunate that he was obliged to confess his inability to find the place again, though the while earnestly protesting his good faith. His companions felt themselves duped, and angrily recalled the unfortunate man to the terms of the contract, coolly informing him that if he had any prayers to say it was time to commence.

In an agony of despair, though believing the place must be near, he sank on the ground and buried his face in his hands. One of the party approached and stood glaring at him, when casually glancing on the ground at the doomed man's feet, he saw a piece of mineral similar to that exhibited by Mr. Golden in Los Angeles. The mine was located, the party then returning to Los Angeles, where Mr. Golden was paid his \$5000. A corporation known as the Salt Springs Mining Company was formed, and in 1852 a five-stamp mill was erected and kept in operation continuously during the following winter seasons until January, 1864, at which time the Pute Indians, who were on the warpath, massacred every one at the mine, burned the mill and sacked the camp.

After the burning of the mill, Mexicans secured leases on the property and worked the ore in arrastras, realizing, it is said, fabulous sums.

Undoubtedly the mine was of a pookety character, as it was afterward abandoned for years and relocated a number of times. In 1880, under the management of C. A. Luckhardt of San Francisco, the concern was reorganized and listed on the New York Stock Exchange, where the stock sold as high as \$15 a share. But little work of development was done at the mine and the entire scheme soon fell through, the mine finally becoming the property of J. B. Osborne of Daggett, the present owner.

The water of Salt Springs contains about the same percentage of chloride of sodium as that of the sea. The altitude is 800 feet above sea level, and it is situated about 60 miles directly northeast of Daggett. At 1 p. m. May 2, 1890, the temperature was 88 degrees in the shade.

The many stories of fabulous discoveries in the desert regions are to a great extent apocryphal and have no foundation in fact. Every mining district has its lost cabin; the desert region its Breyfogle, Lee, Gunsight, Pegleg, and other fakes, on the rediscovery of which both life and money to a considerable amount have been lost without any good results.

My authority for the above version of the Golden discovery and ultimate result is Mr. M. Marsh, one of the earliest pioneers of our State and county, and an inhabitant of the desert regions for many years.

(To be Continued.)

THE Mount Morgan gold mine, Australia, paid dividends of \$5,363,150 in 1889. This is the greatest gold mine in the world. It was bought a few years ago for \$3115 and is now valued at \$73,000,000—in fact \$90,000,000 have been refused for the mine and works. The machinery and plant cost nearly \$5,000,000. During the year ending November 30, 1889, 75,415 tons of raw ore returned 223,522 ounces of gold, equal to 4 ounces 6 pennyweights 4 grains per ton for the total ore raised.

THE Pomona Progress says: The Calkins Coal Mining Company has been incorporated at Santa Barbara with a capital of \$1,000,000. The mine to be developed lie near to South Riverside. The coal obtained from the South Riverside and Elsinore coal belts is not marked first-class, but it is found to improve in quality as depth is attained.

GEORGE DAVIS, a miner in the Manhattan mine, Grass Valley, becoming faint from powder fumes, fell off a ladder down the shaft a distance of 80 feet. His partner went at once to his relief and found him with his head in the snmp. He was quite severely injured, but is now making good progress toward recovery.

GYPSUM.—The Santa Barbara Press says: Fifteen men are constantly employed in the gypsum mine in the Ojai, and the quality now being removed is superior to any product heretofore taken out. It is put in sacks at the mine and hauled to Ventura for shipment to San Francisco, where as high as \$18 a ton is paid for it.

THE Committee on Library and Museum of the Board of Regents of the State University has asked for an appropriation of \$5000 for the purchase of scientific books.

FIVE SHINGLE MILLS at Chehalis, Wash., have been kept running for months, turning out 400,000 shingles a day.

Mineral Lands.

Proposed Change in Existing Laws

The House Committee on Mines and Mining has reported to the House, with amendments, the Senate bill which passed the Senate, Dec. 18, 1890, and was submitted to the House next day. It has been in the hands of the committee since that time. The following is the full text of the bill as it passed the Senate:

SECTION 1. That section twenty-three hundred and twenty-four of the Revised Statutes be amended so as to read:

"SEC. 2324. The miners of each mining district may make regulations, not in conflict with the laws of the United States or with the laws of the State or Territory in which the district is situated, governing the location, manner of recording amount of work necessary to hold possession of a mining claim, subject to the following requirements: The location must be distinctly marked on the ground by posts or monuments, so that its boundaries can be readily traced. All records of mining claims hereafter made shall contain the name or names of the locators, the date of the location, and such a description of the claim or claims located as will identify the claim. On each lode claim located after the tenth day of May, eighteen hundred and seventy-two, and until payment of the purchase money and a certificate of entry has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year. On all lode claims located prior to the tenth day of May, eighteen hundred and seventy-two, ten dollars' worth of labor shall be performed or improvements made during each year for each one hundred feet in length along the vein until payment of the purchase money and a certificate of entry has been issued therefor; and for each twenty acres of placer claims, and for each subdivision thereof less than twenty acres, ten dollars' worth of labor shall be performed or improvements made during each year until payment of the purchase money and a certificate of entry shall be issued therefor. But where several adjoining lode claims, not exceeding five, are owned or held by the same person, association, or corporation, and the sum of five hundred dollars or more is expended in any one year in good faith for the development of all of the claims so owned or held, not exceeding five, there shall be no requirement for separate labor or improvements to be performed or made on the several claims so owned or held during each year. The year within which the annual labor or improvements required to be performed or made by this section shall commence at twelve o'clock meridian on the first day of October of each year: *Provided*, That upon claims located previous to the first day of March in any year, the annual labor or improvements shall be performed or made on such claim for that year prior to twelve o'clock meridian of the first day of October next succeeding; and upon claims located after the last day of February and prior to twelve o'clock meridian of the first day of October in any year the annual labor or improvements required shall be performed or made within one year from twelve o'clock meridian of the first day of the succeeding October: *And provided further*, That only one-half of the annual labor or improvements required by this Act shall be necessary to be performed or made prior to twelve o'clock meridian of the first day of October, in the year eighteen hundred and ninety-one, on claims upon which the annual labor or improvements were performed or made in the year eighteen hundred and ninety; but after the first day of October, in the year eighteen hundred and ninety-one, the full amount of labor or improvements required by this Act shall be performed or made upon such claims as in all other cases during each year prior to twelve o'clock meridian of the first day of October. In case the first day of October falls on Sunday or any holiday, the following secular day shall be construed as the first day of October within the meaning of this Act. When the labor required by this Act shall have been performed or the improvements made, an affidavit may be filed within thirty days after the time limited for performing such labor or making such improvements with the recorder of deeds of the county in which the claim or mine is situated, particularly describing the labor performed and improvements made, and the value thereof, which affidavit shall be prima facie evidence of the facts therein stated. And upon a failure to comply with the conditions of this Act in the performance of labor or making of improvements, the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made: *Provided*, That the original locators, their heirs, assigns or legal representatives do not resume work upon the claim after such failure and before such relocation, and continue the same with reasonable diligence until the required amount of labor shall have been performed or improvements made; but no relocation of a claim by a person who has already located such claim and failed to comply with the conditions of this Act in performing work or making improvements shall be valid prior to such resumption and continuance of work upon such claim. Upon the failure of any one of several co-owners to contribute his proportion of the expenditures required hereby, the co-owners who have performed the labor or made

the improvement may, at the expiration of the year, give such delinquent co-owner persona notice in writing, or notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days, and if at the expiration of ninety days after such notice in writing, or by publication, such delinquent shall fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his co-owners who have made the required expenditures. A copy of such notice, together with an affidavit showing personal service or publication, as the case may be, of such notice, when filed and recorded with the recorder of deeds of the county in which such mining claim is situated, shall be evidence of the acquisition of title of such co-owners. Where a person or company has or may run a tunnel for the purpose and with the intent in good faith of developing a lode or lodes owned by said person or company, the money so expended in running said tunnel shall be taken and considered as expended on said lode or lodes: *Provided further*, that said lode claim or claims shall be distinctly marked on the surface as provided in this Act."

SEC. 5. That section twenty-three hundred and thirty-seven of the Revised Statutes be amended so as to read:

"SEC. 2337. Where non-mineral land not included in a lode claim is used or occupied, or is intended in good faith to be used or occupied by the proprietor of such vein or lode claim for mining or milling purposes, such non-mineral surface ground may be embraced and included in an application for a patent for such vein or lode claim, and the same may be patented therewith or separately, subject to the same preliminary requirements as to survey and notice as are applicable to vein or lode claims; but no location hereafter made of such non-mineral land shall exceed ten acres, and payment for the same must be made at the same rate as fixed by this chapter for the superficies of the lode claim. The owner of a quartz-mill or reduction works, not owning a mine in connection therewith, may also receive a patent for his mill-site as provided in this section."

SEC. 6. Amend section twenty-three hundred and thirty-eight of the Revised Statutes so as to read:

"SEC. 2338. As a condition of sale each patent shall reserve the right of way through or over any mining claims for roads, ditches, canals, cuts, tunnels, and other easements, for the purpose of working other mines: *Provided*, That any damages occasioned thereby shall be assessed and paid in the manner provided by the laws of the State or Territory in which such mine is situated for assessments and payments for land taken for public use under the right of eminent domain. And the rights and easements heretofore reserved under the provisions of this section (twenty-three hundred and thirty-eight of the Revised Statutes) in patents heretofore issued shall be regulated and made available as herein prescribed."

SEC. 7. That town-site entries may be made by incorporated towns and cities on the mineral lands of the United States, but no title shall be acquired by such towns or cities to any vein of gold, silver, cinnabar, copper, or lead, or to any valid mining claim or possession held under existing law. When mineral veins are possessed within the limits of an incorporated town or city, and such possession is recognized by local authority or by the laws of the United States, the title to town lots shall be subject to such recognized possession and the necessary use thereof, and when entry has been made or patent issued for such town sites to such incorporated town or city, the possessor of such mineral vein may enter and receive patent for such mineral vein and surface ground recognized by the local laws and statutes of the United States not held or possessed adversely to the claimant for such mineral vein by other than the said city or town, or when it shall appear that the claimant otherwise entitled to such mineral vein has acquired title to such surface ground from the said city or town: *Provided*, That no entry shall be made by such mineral-vein claimant for surface ground where the owner or occupier of the surface ground shall have had possession of the same before the inception of the title of the mineral-vein applicant.

THE EXPENSES of the Consolidated California and Virginia mine for the month of December amounted to \$84,899.07, including \$35,200 for reduction of ores, \$33,222.14 for salaries and wages and \$13,371.17 for mine supplies. After paying the expenses the company had a balance on hand of about \$90,000, and the only outstanding indebtedness was about \$25,000 due the Tunnel Company for royalty on ores extracted, the tunnel company having previously received \$100,000 from the Consolidated California and Virginia on account.

NATURAL GAS.—Natural gas has been discovered on the lands of James Hunter and Joseph Wilson, only three miles from this city, and in such a way as to indicate the existence of an inexhaustible body. The discovery was made recently, accidentally, we are informed, by the lighting of a match, when a body of gas went off in a flame. The gas was flowing on the surface, and the finding of it was a great surprise. —*Vallejo Chronicle*.

THE project of sinking a gas well at Salinas is about to be resumed. The well is now down 1050 feet. It has an eight-inch bore.

A Buffalo Ranch in California.

Monterey county is to be the seat of a new California industry, in the shape of a buffalo ranch, near the Carmel Mission. There are now in the stables at Del Monte three fine specimens of the American bison, a bull, a cow and a calf, the last a progeny of the former two. Last Sunday's *Examiner* had a two-column article illustrated with the portraits of the illustrious trio, which, with the exception of a domesticated herd in Kansas, a small band under Government protection in the Yellowstone Park and a few held in captivity on a ranch in Colorado, are the last representatives of a distinctive and mighty American race, that can be saved from extinction now only by domestication.

A seven-mile drive took the writer from Del Monte to Pebble Beach, where the buffalo ranch is to be located, where Winston, the owner, was found busily at work arranging for their reception.

The ranch, which comprises about 100 acres, is located in the lee of Cypress point, overlooks Carmel Bay, and slopes easily down to Pebble Beach. Water is brought from the Carmel river reservoir, and cypress and pine trees afford ample shelter.

"I bought the cow of Redhres, one of Sitting Bull's warriors, about three years ago," explained Winston. "She was captured during the last buffalo hunt of the Sioux, in the fall of 1882, on the headwaters of the Big Cheyenne, not far from Fort Pierre, on the Big bend of the Missouri, in South Dakota. I am the first white man who ever owned her. She is now in perfect form. You know a buffalo doesn't mature until eight years of age, and Janie is just past eight."

"The bull I captured myself on the 16th of June, 1886, 65 miles southwest of Jamestown, N. D. He is the last buffalo ever captured alive in the Dakotas. I killed his mother and the calf was then so small that he didn't try to get away, but lay hidden in the long grass. I picked him up and carried him away."

"The calf was born in Portland, Or., Oct. 1, 1889, and is named the Duke of Portland. He was the first buffalo horn west of the Rocky mountains."

"These are the only buffalo on the coast and I am assured by Gen. Miles, Gen. P. E. Conner and other military men that they are the finest they have seen in captivity."

"Oh yes," he continued, "they stand captivity all right, and the climate agrees with them admirably. They eat anything that cattle will, and I am sure will thrive here."

"They know me, and I can do almost anything with them; but they will not make up with a stranger. The bull knows that I am not afraid of him, and submits to my will, but he can tell in an instant that a stranger views him with distrust, and when you glance at a tree or a convenient fence in case he should get loose, he knows just as well as any one that you are afraid of him, and immediately lowers his head and charges."

"I am going to stop here on the ranch and attend to the animals, which we shall have out here in about six weeks. I shall have an inclosure up there where you see the line of posts, under the pines, of about eight acres within the large field. The fence will be five boards high, and I think buffalo-tight. In order to make certain, however, I shall put rings on the bull's horns, and a triangle chain from the ring in his nose to the rings on his horns, which will keep him from breaking it down. I shall seed the inclosure to alfalfa and go about raising buffalo just as I would cattle."

"It will be a strange fact that here within sound of the bells of Mount Carmel, and just where old Father Junipero Serra located the pesadero, the buffalo should be saved from becoming extinct by domestication."

"In addition to rearing the pure buffalo I shall cross them with a herd of Galloways, and also with the native cattle. The cross is a successful one and has been carried down to the sixteenth generation. The Galloways are peculiarly adapted to this purpose; their coat is jet black and long, and in appearance they resemble the buffalo more than any other breed of cattle, except that they are hornless."

"The hair of the Galloways is extremely fine and the cross produces a superior buffalo robe, equal to sealskin. Some that have been obtained in Kansas have sold as high as \$250 each."

"We shall kill the progeny for their hides, and the beef will also prove valuable. Buffalo beef is the best in the world. Of course when the animal runs wild it is strong and sinewy, but when brought up in captivity and stall fed it has no equal." —*Salinas Index*.

FURNACES CLOSED DOWN.—The *Independent Callistogian* of the 14th says: Two furnaces have been in operation at the Etna quicksilver mine three or four months. The other day, however, one was shut down and the present week the other will also be shut down. About a thousand flasks of quicksilver were obtained during the season of operation. The furnaces are shut down because there is no more ore mined and ready for them. It will be some time before the fire will again be lighted.

LARGE SHIPMENTS of marble continue to be made from the Inyo county marble quarry. A great deal of machinery has been added to the mill at Verdi, and the mill is kept steadily running to its full capacity.

Hydraulic Mines and the Governor.

One day last week Senators Fraser of El Dorado, Voorhees of Amador and Calaveras, Preston of Nevada, Mead of Sierra, and Campbell of Solano, accompanied by Assemblymen Hail, Hocking, Garver, Baughman, Brown, Hunnerville, Robertson, Shanahan, Muir, Martin, Freeman and Gould, waited upon the Governor and presented the following:

Governor Markham:—As the representatives in the Legislature from the mining counties, and those representing mining interests, irrespective of party affiliation, we have met you this morning as the Chief Executive of this State to tender you our hearty congratulations and approval of the sentiments expressed in your inaugural address upon the mining industries of this State.

We congratulate ourselves and the thousands of fellow-citizens engaged in mining upon having in the Executive Chair one who has been brave enough to suggest the possibility of the amicable adjustment of the differences between the mining and valley counties of this State, whereby our mines and water ditches, which have been lying idle under the restraining order of the law so long, may be revived.

We believe that the stopping of the hydraulic mines has been of incalculable damage to the revenues of the State, and more especially to those residing in the mining counties dependent upon that great industry for the support of themselves and families.

We believe that our mining industries have not received the recognition, the support or the protection their importance entitles them to from those in authority.

As the representatives of that great industry in the Legislature, we do not ask the enactment of any law which would permit the destruction or damage to the property of others in the enjoyment of our own, but only that an honest, earnest effort be made to the end that hydraulic mining may be resumed under such regulations and restrictions as will be to the mutual benefit of all industries and employments, and to the injury of none.

We believe that the recommendation touching this subject, as set forth in your inaugural address, is the only proper course to pursue to accomplish the desired result, and as the direct representatives of the people upon that important subject in the Legislature, we recognize in you a firm friend and trust we shall have your endorsement and approval of such measures as may be presented to the Executive for approval.

THE OREGON IMPROVEMENT COMPANY.—The business of the Oregon Improvement Company, which had practically been at a standstill for the last two months, will be conducted by a syndicate of New York capitalists. About two months ago the company's property was attached and a receiver appointed. It includes the steamers Willamette and Puebla, coal mines at Seattle, large tracts of land in the Northwest, an extension of the Seattle & Northern railroad to Hamilton, the main line itself, and the unfinished line of the Port Townsend & Southern railroad. As soon as the receiver took charge the steamers were tied up, work on the extension of one of the roads and the construction of another was brought to a standstill, and fully 1000 men were thrown out of employment. The coal mines were operated, however, pending a final decision of the matter. An arrangement has now been made by which a New York syndicate takes charge of the company's affairs. The former trouble has been amicably adjusted, the receiver's task is at an end, and the representatives of the company received from him the business. The steamers, which had been tied up, will be put on, and the railroad construction, in which 1000 men were employed, will be resumed at once. The stock of the concern jumped from \$15 to \$24 per share in a few hours after the news arrived.

EEL RIVER COAL.—The San Francisco & North Pacific Railway has just concluded making experiments with coal from the Eel river mines, in Humboldt county. Two tons of the fuel were placed on the engine tender at Thurston, and the quantity was sufficient to feed the engine all the way to Healdsburg. The managers of the railroad express themselves as highly pleased with the results of the experiment. The coal burns well, and although a ton of it does not run an engine quite as long a distance as the same amount of Australian coal, yet the Eel river fuel can be mined and laid down in San Francisco at a much cheaper rate, and when the Eel river mines are more fully developed there is every prospect of a revolution in the local coal trade.

TIMES are lively in mining circles at Tintio, Utah. The hills are filled with prospectors and a number of important "deals" have lately been made.

THE second flowing artesian well in New Mexico was struck at Roswell, in Pecos valley, last Saturday. The well is only 297 feet deep.

THE old slag pile at the Tomitohi Valley works and the Moffatt smelter in Gunnison, Colo., are being worked over.

THE Mingo smelter, Utah, is running four stacks and using up about 125 tons of ore per day.

MINING SUMMARY.

The following is mostly condensed from journals published the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CRUSHING.—Amador Ledger, Jan. 17: We understand a test crushing of ore from the Hardenburgh mine at Middle Bar will be made shortly at the mill of the Amador gold mine. At the Gardner mine the rock-breaker has been giving them considerable trouble on account of frequent breakages. A machine of more improved pattern was received this week, and things will move along at a much better gait when it gets in position. The Zeile mine, which has been running short-handed for two or three months on account of repairing the shaft, will probably take on a full force next month. The McKenzie mill at Irishtown will crush 15 or 20 tons of ore from the small seams of rich rock encountered in the tunnel on the Clinton Peak property for test purposes.

BUNKER HILL.—The machinery for the new Bunker Hill mine is being put in place very rapidly. The pipe from the reservoir to the water-wheel has been laid. Mr. Myers, the superintendent, expects to have everything in running order by the first of next month. Some fine paying ore is being taken out of the tunnel near the mill. The new pumps at the Gover are a grand success. They throw a steady stream of 12 inches of water and will be able to keep the mine clear by only running a few hours a day. The electrical part of the plant runs very smoothly and requires but little attention. They have the lower pump in place, and will commence to pump out that portion of the mine under water for so many years, at once. After the dynamo is started and pumps running, no further attention is needed, as it is supplied with a self-feeding oil device, that oils bearings as needed. At the 300 level they have struck a new pay chute of ore, which promises to be a valuable ore body. A large force of men will be immediately put to work in opening out the lower levels and in sinking shaft deeper.

Calaveras.

RUNNING.—Mountain Echo, Jan. 15: The Gold Cliff mine is kept in motion day and night, likewise the mill. The mine is yielding good returns. The Lane & Tulloch mine and mill are running steadily, and as near as we can ascertain, the property is paying well.

UTICA.—Since the accident on the 5th inst., the Utica mine has been closed down pending repairs. Operations in the mill and mine will be resumed some time during the coming week.

El Dorado.

THE VAN MINE.—Georgetown Gazette, Jan. 15: The striking of rich ore in the Van mine on Tuesday has created considerable interest. The ledge, spur, stringer, whatever it may be, was reached by a 32-foot crosscut from a 60-foot shaft, but the point where the ledge was found is 80 feet below the surface, the ground having been sluiced off. Although the milling test of surface ore which has been going on for the past three weeks was highly satisfactory and a spirit of buoyancy prevailed among the crew, yet great anxiety was felt by all over the final result of the crosscut. Up to this writing the ledge had been penetrated about three feet, and the richness continues, every pan showing from a pay prospect to 10 or 15 cents in free gold. The soft decomposed quartz is similar to that above, and should the ore already uncovered continue and carry its richness, the Van will rank among the regular hullion-producers in the State.

NEW TUNNEL.—Mountain Democrat, Jan. 17: The water in the Epley shaft has been sufficiently lowered to enable the putting of a force of men at work driving the new tunnel south from the shaft. The tunnel is now being driven from both ends, on the lead. It is understood that on the completion of the tunnel, a mill will be erected at the outlet and ore crushing begun.

TRUE MILL.—The old True mill in Big Canyon, we understand, is to be put in working trim at once. When in order, it will be used jointly by the True and Harmon companies for making prospect runs of rock. Both companies are steadily developing, have good rock, and will determine its value as they proceed, by regular millruns as well as assays.

JOSEPHINE.—Georgetown Gazette, Jan. 15: Supt. L. Evans came down from the Josephine mine Sunday. The mill has been re-covered, and a new carpenter and smith's shop built. Parties were up examining the mine with the view of taking a contract to push in the No. 5 tunnel. The Cock Robin mine starts up this week, and the Rocky Gorge mine will be ready for business in the spring. General activity prevails among the mines of Volcanoville District.

GEORGETOWN DIVIDE.—The auriferous deposits of this divide are well known for their character and importance as bullion-producers in the past, and are far from being exhausted, but give promise of still important yield of the precious metal and an encouraging outlook to the financial future of this divide. The developments in mining, during the past year, give great hope and expectations for a revival, in the near future, of mining enterprises that will add much to the yield of bullion and general prosperity. While for the poor man mining on this divide offers little beyond day wages, the field is an inviting one for capital properly directed, and the writer confidently anticipates an early era in mining that will give permanent prosperity to the North Side.

Nevada.

W. Y. O. D. MINE.—Grass Valley Union, Jan. 15: The stockholders of the W. Y. O. D. quartz mine have every reason to be satisfied with the way in which it is developing, as it is now on an excellent basis, being out of debt and yielding a monthly profit of from \$1500 to \$2000 over expenses. The vein is of good size, the ground works easily, and enough is opened to give a large amount of backs in the stopes, while the drifts are being constantly carried forward to open up new ground. The incline shaft is down to the 7th level, which produces fine milling ore, and the shaft is being carried down for the 8th level, which will open up more new ground that will undoubtedly largely increase the product of the mine. The prospects are so encouraging that the company contemplates at an early day to increase the capacity of their works by putting in heavier pumping and hoisting machinery, and the

erection of a ten-stamp mill. At present the machinery is light, and the mill in use has but five stamps. Were it not for these improvements the company could commence dividends within a short time, but it has been determined that it will be the better policy to devote the profits for awhile to put a plant on the mine that will enable the workings to be sunk down to twice their present depth, and to largely increase the working force and the general operations. The W. Y. O. D. mine is an evidence of what can be done by pluck and energy. Several years ago six young men secured the location and went to work upon the vein. They had no capital, but they did have stout arms and willing minds, and determined to open a mine with their own labor. They christened their venture the W. Y. O. D. Co., which was an abbreviation of "work your own diggings," and went to work with energy. They had fair prospects at the start to encourage them, and were not long in getting down a shaft several hundred feet. As depth was attained expenses increased, and the quartz taken out did not always yield a profit, which was rather discouraging. A portion of the stock was sold to raise money, and then assessments followed. Some of the original members sold out their interests at small prices, but others held their faith, even through the greatest discouragement, and stuck to the mine in the hope that "good pay" would be struck by deeper and more systematic exploitation. Their confidence has not been misplaced, and the more the mine has been opened the better have been the results, until the W. Y. O. D. is now solid on its feet and the best little mine in this valuable and reliable mining district.

MORE SPECIMENS FROM THE HARTERY.—Tidings, Jan. 15: Supt. Fowler brought to town to-day another batch of rich specimens from the Hartery mine. The specimens were struck last night and nearly a carload was extracted, the value of which is estimated from \$3000 to \$4000. The ledge in the bottom drift from which the specimens were taken is four feet in width. The Larimer mill is kept running steadily from rock from the mine, all of which pays well.

A GOOD CLEAN-UP.—Grass Valley Union, Jan. 18: The final clean-up of 56 loads (112 tons) of ore from the Peabody mine was made at the Crown Point mill yesterday, and the result was \$30 to the ton, independent of about \$800 in specimens from the same ore which were sent to San Francisco. This ore was taken from the 225-foot level of the mine, west, and was below any of the previous workings of the mine, and where the ledge is showing regular and of good size, and where the stopes will furnish 100 feet of backs containing ore of the same quality. The crushing is an excellent one, and shows that the Peabody gives full promise for the future, and that with deeper exploitation it may be expected to be a regular and profitable bullion-producer.

HARTERY CLEAN-UP.—The Hartery mine had a clean-up of ore at the Larimer mill yesterday, which will realize about \$5000. It is the product of a three weeks' run. The Hartery mine is looking well in its lower drifts and stopes.

THE MANHATTAN SHUT DOWN.—Transcript, Jan. 18: The effort to re-open the Manhattan mine on Gold Flat has proved a failure. Considerable work has been done there within the last few months in cleaning out the old shaft and searching for the continuation of the ore body which yielded good results to former owners, but the developments were not of an encouraging character. The machinery put on the claim by the last company has been torn down and returned to the parties from whom it was obtained.

A PAYING MINE.—About 100 men are regularly employed at the Darbec drift mine and the operations are carried on at a profit to the stockholders, thanks to Supt. Gallavotti's capable and honest management. Paying gravel mines are good things to have in a neighborhood. Nevada City has a good prospect of soon possessing several.

Inyo.

MODOC BULLION OUTPUT.—Index, Jan. 14: The following is a statement of the metals obtained from the ores mined and sold by Frank Fitzgerald during the year ending Dec. 31, 1890, being the combined product of the Modoc Consolidated mines and those of Mr. Fitzgerald, as appears by returns of ores from the Melrose and the Selby Smelting and Lead Companies: Fine silver, 49,274 ounces, at average price of \$1.03 per oz., \$50,752.22; gold, \$1,941.22; lead, 281,434 lbs., at average of \$4.75 per 100, \$13,368.11. Total, \$66,065.55. Had the mines been worked during the entire year the product would have been at least 200,000 more, but for various reasons no work was done during three months of the summer. There are 30 men at work on the Hill at present, and the outlook for the current year is very promising.

Placer.

DOING WELL.—Placer Herald, Jan. 17: H. T. Power, superintendent of the Mayflower mine, near Forest Hill, was in Auburn early in the week. He reports the Mayflower and the Hidden Treasure mines as both doing well, and working at present about 70 men each.

Plumas.

AT GIBSONVILLE.—Cor. Plumas National, Jan. 17: The Thistle shaft is down 416 feet. They have just finished retimbering 90 feet of the shaft. They had to retimber on account of the ground sliding and twisting the timbers. They will soon be ready to commence sinking again. The contractors, Messrs. Gillis and Phillips, have both gone to San Francisco.

Shasta.

A PURCHASE.—Redding Democrat, Jan. 16: The Redding Reduction Works Co. has purchased a mine on Spring creek, about four miles from Copley, and will move their plant to the mine. Henry Dieble is now at the mine putting up a mill building and hoarding-house.

ENCOURAGING.—Shasta Courier, Jan. 17: The Quartz Hill and Old Diggings mines, old ones, new ones, and new prospects, are, as a general thing, showing up in fine and encouraging shape. We don't "puff" up every small strike or "Missouri prospect" as a big thing and a mine, but record solid, or what appears to be, strikes or developments. It is a theory of some miners that white flint quartz ledges, of which there are thousands in this county, are barren. Experience is demonstrating to the contrary, as several such ledges in Iron Mountain and Old Diggings districts are proving very rich in free gold and sulphurets.

SOLID QUARTZ.—Chas. P. Summers, who is doing work on the Dan Haskell mine, Iron Mountain, is now in an eight-foot wide ledge of almost solid quartz, the only "flaws" in the formation being streaks and bunches of valuable ore, and such flaws are certainly not objectionable. Summers has just forwarded a lot of ore to Haskell's order and it will be reduced in San Francisco.

Sierra.

NOT A SUCCESS.—Mountain Messenger, Jan. 17: The tramway at the Mountain mine is not a success, the inventor having failed to make it work. The mill has been shut down and all the men again discharged. We are reliably informed that the company is fully satisfied with the character of the rock thus far worked.

Siskiyou.

QUARTZ.—Yreka Journal, Jan. 14: Allen Davis has discovered a valuable quartz ledge on Willow Creek, in the mountains about a mile and a half west of his place, which assays \$30.02 to the ton according to the test of Sam Bell, a brother of Judge Bell of Shasta county. The ledge is 40 feet wide in the 24-foot shaft sunk by Davis, and can be traced from Guy's gulch near Orr's, a few miles south of Yreka, starting a little east of north, and ranging southwesterly into the dividing ridge between Shasta and Scott valleys. Several other locations have been made on the extensions both north and south of the claim of Mr. Davis, and the prospects indicate that extensive works will be erected to crush this quartz, as such a mammoth ledge would pay well for milling at even \$2.50 a ton. Gold has always been found to some extent on the east side of Yreka basin and Scott valley, and we see no reason why it should not exist in the range from Scarface to Trinity and Scott mountains, as well as on the latter mountains. In a few days, the record of claims taken up will be filed in the Clerk's office and companies will be organized to commence operations on an extensive scale. Mr. Davis has been prospecting this section for five years past, and it was also prospected years ago by our old friend, T. J. Sullivan of Sisson, and Ah Edwards of Gazelle, though Davis asserts they were not on the ledge that he has discovered. The present cold weather has caused a suspension of mining in several places, owing to the water supply freezing, but in a short time we may anticipate storms and milder weather to afford a good supply of water for all kinds of mining and to furnish power for the quartz-mills run by streams.

NEVADA.

Washos District.

CON. CAL. & VA.—Virginia Chronicle, Jan. 17: 1300 level: Continue to extract some ore from the point where the upraise carried up from the end of the east crosscut from the south drift connected with the fourth floor stopes. 1500 level: From the drift run north from the drift run west from the upraise carried up from the north lateral drift (43 feet above the sill floor of this level) at a point 20 feet in the drift, an upraise has been carried up 30 feet. From this upraise we have taken some ore about the average value of ore extraction. 1600 level: Continue to take out some ore along and above the line of the drift run east through the old stopes on the sill floor of this level; also from the stopes which we are working southerly from that drift. At a point 200 feet south from the north line of the California ground at a point 44 feet above the sill floor of this level the west drift from the south drift has been advanced 8 feet; total 23 feet. From this point are stopping the ore. The average assay from this portion of the mine is \$30 per ton. There has been extracted from all parts of the mine during the week 1214 1140-2000 tons of ore which was shipped to the Eureka mill. The average assay value of all the ore worked at that mill during the week (1380 tons) was \$18.10 per ton.

SIERRA NEVADA.—Northwest drift from the shaft station, 630 level, has been extended 57 feet; total 341 feet; continuing in porphyry formation.

OPHIR.—The drift started north from the drift run west from the winze 122 feet below the sill floor of the 1300 level has been extended 25 feet; total 119 feet; continuing in quartz of very low assay value.

UNION CON.—East crosscut No. 2, 1465 level, started from the north lateral drift at a point 200 feet north from the south boundary line of the mine, has been extended 22 feet; continuing in porphyry which carries some clay and quartz.

MEXICAN.—East crosscut No. 1, 1465 level, started from the main north lateral drift at a point opposite the west crosscut No. 1, has been extended 39 feet; total 304 feet; continuing in a porphyry formation showing some clay.

BEST & BELCHER.—800 foot level: West crosscut No. 2 has been extended 10 feet, passing through hard quartz showing some value; total length 418 feet.

CHOLLAR.—No work has been done in the raise from the 850 to 650 levels, owing to repairs to crosscut 80 feet south of the north line. Extracted and sent to the mill the past week 527 tons of ore; average battery assay, \$22.16 a ton.

POTOSI.—East crosscut No. 3, 150 feet north of winze, 1130 level, is out 66 feet; face in porphyry. The winze is down 105 feet below the 1230 level. The bottom is in clay, quartz and porphyry.

ALPHA.—The east crosscut 70 feet north of shaft, 600 level, is out 283 feet, face in clay and porphyry.

EXCHEQUER.—East crosscut near the south line, 600 level, is out 244 feet; formation porphyry and clay. East crosscut on the north lue is out 25 feet; formation quartz, clay and porphyry.

CON. NEW YORK.—East crosscut 150 feet north of shaft, 1100 level, is out 70 feet; face in clay and quartz.

SILVER HILL.—Northeast drift from the winze on 160 level, is out 580 feet; face in porphyry. Northwest drift, 334 level, is out from shaft 800 feet; face in hard porphyry.

CROWN POINT.—New northwest drift on 500 level extended 30 feet; total, 175 feet. The ground is softer with a slight seepage of water.

CONFIDENCE-CHALLENGE.—The joint Confidence and Challenge north drift on the 300 level is now in 154 feet. The face shows 8 inches of fair ore. This drift is now 23 feet in Confidence ground.

OCCIDENTAL.—South drift from the bottom of No. 5 winze 650 level, is in 84 feet; face in low grade quartz. Work at 300 and 450 levels confined to repairs.

BELCHER.—The north drift from No. 2 crosscut on 200 level is out 116 feet, having been advanced 28 feet during the week. The face is clay and

porphyry. Will crosscut from it during the week. The 400 level raise has been extended 14 feet, and is up 37 feet on the slope. The top is in low grade quartz. Are still running from the fifth floor of the old 300 level raise on a streak of fair grade ore.

ANDES.—The south drift on 420 level was extended 8 feet and work in the face suspended for the present. From south drift on 430 level an east crosscut has been started and is now in 13 feet.

SEG. BELCHER.—South drift from Belcher shaft, 600 level, is out 24 feet; total, 70 feet; face in soft porphyry.

GOULD & CURRY.—400 level: At a point in west crosscut No. 3, 41 feet from the northwest drift, started and advanced a south drift 15 feet; formation quartz showing some value.

YELLOW JACKET.—Doing the usual prospecting work at the different levels and shipping 40 tons of ore per day, the average battery assay of which is \$18 per ton.

OVERMAN.—Extracted 363 tons and 1200 pounds of ore. Car samples average \$13.96 per ton. Shipped to the Brunswick mill 400 tons of ore. Upraise from northwest drift on the 1100 level has been extended 14 feet through ore of fair grade; total length 100 feet.

JUSTICE.—The 400 level south winze was sunk eight feet; total depth, 41 feet. The bottom is in fair milling ore. Shipped to the mill during the week 179 tons of ore. Average battery assay \$22.28 per ton.

KENTUCK.—The east crosscut on the 1000 level was advanced 14 feet during the week and is now out 212 feet east of the winze. It has reached what looks like the east wall and has been stopped. Are now repairing the raise from the 1000 level in the west ledge and to raise and run north on the east ledge.

CON. IMPERIAL.—During the week have been overhauling the old stopes and following up small streaks of ore from the upper levels.

UTAH.—Northwest lateral drift from the shaft, 725 level, has been extended 37 feet; total length, 271 feet, in a porphyry formation. In this north lateral drift, at a point 250 feet in, west crosscut No. 1 has been started and advanced six feet.

SAVAGE.—During the week we have hoisted 630 cars of ore from the 300, 400, 500, 600, 750 and 1300 levels, and from the winze below 1300 level. Shipped to the Mexican mill 547½ tons of ore; ore milled, 520 tons; average battery assays, \$16 a ton. Have bullion on hand at the mill amounting to \$8610.30. The bullion yield of the mine for the month of December, 1890, was \$30,276.62. On the 300 level we started an east crosscut from the southeast ore stope and advanced same 28 feet; face in porphyry and quartz.

HALE & NORCROSS.—On the 1400 level the north and south drifts from the station have been opened and extended 55 and 30 feet respectively. Both of these drifts are in quartz and porphyry. Opposite the incline on this level we have started an east crosscut No. 1 and advanced the same 25 feet. The face is in porphyry and stringers of quartz.

Eureka District.

RICH ROCK.—Eureka Sentinel, Jan. 17: Chet Batchelder a few days ago assayed a piece of gold ore from the Prospect Mountain tunnel. It weighed 47.7 grammes and contained about \$30. The assay value of the piece of ore was \$578,746.77 per ton in gold. The ore generally found on the west side of Prospect Mountain contains a great deal more gold than silver. This piece was of extraordinary richness. It is stated by good authority that a strike of considerable importance has been made by the Eureka Con. Co. in their K K mine. It is said to be extensive and of a high grade of ore.

Jumbo District.

GOOD PROSPECTS.—Virginia Chronicle, Jan. 12: Over in Jumbo district good prospects continue to be reported. The Jumbosambo mine, owned by Harry Summers and other Carson capitalists, is being properly developed under the able foreman, Pine. He has a new shaft down 30 feet, with a very promising vein of ore assaying from \$15 to \$20 per ton.

Winnemucca District.

WINNEMUCCA MOUNTAIN.—Silver State, Jan. 17: The newly-discovered mine in Winnemucca mountain, now being developed by Dr. T. C. Hanson, Joseph Alexander, C. D. Hanson and G. W. Rose, and called the Gold Bug, is proving to be quite a large vein, and if it holds out as it is at present Winnemucca will come to the front as a mining camp. At present the boys are in about 65 feet and the vein in the face is over four feet wide and assays from \$12 to \$30 in gold, with a small percentage in silver. In a drift from the main incline they also have a vein which at present is about 16 inches wide that carries from \$30 to \$60 in silver. Winnemucca mountain, like all of the mining camps in Nevada, on account of the low price of silver, has not produced much bullion in the last 12 or 15 years, but there is any quantity of good mines and a good field for prospecting in the mountain, and when free coinage of silver shines upon this land like the Star of Bethlehem of old, Winnemucca will be one of the foremost towns in the State.

Tuscarora District.

DEL MONTE.—Times-Review, Jan. 17: North drift, 1st level, advanced 12 feet, cutting through two feet of vein matter; sample from same \$37.50 per ton.

NAVAJO.—The stopes below the 350-foot level are still producing some very good ore. Everything in and about the mine running smoothly.

COMMONWEALTH.—First level: North drift from west crosscut advanced to North Commonwealth line, 11 feet, and joint raise put up 17 feet. Raise from south drift put up 25 feet to hanging-wall. Fourth level: East crosscut extended 32 feet in hard rock; slight flow of water.

BELLE ISLE.—The 350 stopes are improving and looking very well indeed, yielding a high grade of ore which is stored in the mine. Hoisted 41 cars of concentrating ore. West crosscut from the 450 level extended 13 feet; face in large blocky ground. A drift has been started south on the vein cut two weeks ago; progress 18 feet. Joint east crosscut, same level, extended 14 feet, cutting considerable vein matter giving low assays.

NORTH COMMONWEALTH.—First level: North drift advanced 11 feet to line and joint raise now up 17 feet; not yet through the vein. Will resume work in north drift as soon as the raise reaches the hanging-wall. Fourth level: North drift advanced 28 feet; the rock is softer and some water. Second

level: West crosscut advanced 28 feet, reaching vein exposing some fair-grade ore; slight flow of water. Have started drift toward Commonwealth line. Hoisted 20 cars of ore; assay \$250 per ton; 76 cars ore, estimated value, \$25 per ton.

NORTH BELLE ISLE.—North drift from Belle Isle, 450 level, extended 15 feet; still showing very large vein. Joint east crosscut, same level, extended 14 feet, showing large quantity of vein matter giving low assays. Upraise from the south drift, 500-foot level, extended 11 feet in hard quartz showing some good ore. This connection will soon be made with the south stope and the ore at that point will be available. The 300 stope is looking about the same, the ore extracted being stored in the chutes below. Hoisted 60 cars concentrating ore, estimated assay value \$18 per ton. Concentrator crushed 318 tons of ore, estimated assay value \$15.09, giving 24 42 tons of wet concentrates, estimated value \$153. Several gangs of tributaries are working in the old 150 stopes.

ARIZONA.

SILVER STRIKES AT RICHMOND BASIN.—*Silver Age*, Jan. 10: Joe Brewster, who was in from Richmond Basin last Sunday, informed us that the recent strike in the Bootjack mine is proving even richer than was expected. Six or seven sacks of ore had been taken out which will assay from \$3 to \$5 per pound in silver, and the bottom of the shaft had scarcely been cleaned up. The ledge at that depth (56 feet) is about four feet wide and all pay ore, averaging 100 ounces or more, and two feet of the ledge, over 250 ounces; in the center is an inch streak of almost pure antimonial silver. The find has not been sufficiently prospected to reveal its extent, but the general belief among miners at the Basin is that Sinds and Richards, the lucky owners, have the mother ledge, which, it is said, can be traced on the surface for a distance of one mile and a half. The Bootjack is only one of several very promising prospects. Moyle and Deam have almost as good a showing in the Harrison & Morton claim, and Moyle says he would not exchange their claim for the Bootjack. At a depth of 25 feet they have eight inches of ore that assays 600 ounces, and the showing is excellent to take out considerable of it. Moyle is confident that, from the character of the ore, the lead is permanent. Kingdom and Cohlbedick, lessees on the Grub Stake of the Mack Morris, have a fine showing—a six-inch streak of ore that goes about 1000 ounces in silver. Ikenberry and Decell, who have a sub-lease on Mack Morris ground, are taking out ore and doing well. Joe Brewster owns one of the best claims in the Basin, the Southern Star, which has already produced considerable ore. The claim lies in a gulch which drains the Basin, and water was encountered in quantity to hinder work. By running a tunnel to connect with the shaft and extending it beyond, giving a length of 200 feet, with several crosscuts, Mr. Brewster has thoroughly drained his mine and opened it up well. The possibilities of the Basin mines for the coming season are great, and it would occasion little surprise here if the work now in progress would result in opening up some of the richest silver mines in Arizona. Richmond Basin is 13 miles north of Globe on the southwest slope of the Apache mountain, with a good wagon-road all the way.

SILVER KING.—*Florence Enterprise*, Jan. 10: At the Silver King mine the usual unsettled condition of affairs exists, brought about by the near approach of the election of a new management. Supt. Groves has continued work in the Bilk shaft for the past year. Report says, if the present management continues the Bilk shaft will be given up and work renewed in the King shaft at the 400-foot level. From here the work will be done toward the South King. There are those who maintain that the King will yet be as good as it ever was, but with no ore in sight, one man can see as far into the ground as another, and no farther. The mill is still running on tailings, but another month will finish them. The Mineral King M. & M. Co.'s plant is up and ready for business. The plant is of 10-ton capacity, all of first-grade workmanship. The water supply comes from the mine. It is said work will begin as soon as the coke arrives. The mine is sunk to the depth of 400 feet. Several crosscuts have been made. W. H. Lemper is still working on the South Comstock and can show as much work done on a claim as any man in Arizona. There are several claims in the neighborhood that are taking out good ore.

REYMERT.—The Reymert will close down about the last of next month for an indefinite period. This action is not the result of a lack of profitable ore, for the mine never looked more promising. Supt. Strohn has just met with a great loss in the burning of his lumber-mills at Sheboygan, Michigan, which left him nearly \$50,000 poorer in pocket, and he will return to the States where his presence is needed. Just when the mine will again resume operations is not known. The mill and mines of the Arizona G. & S. Mining Co. at the Owl Heads, were attached last week to satisfy the demand of A. Goldschmidt & Co., of Tucson, for supplies. It is stated that the total indebtedness will reach nearly \$12,000. The mine has been a steady producer and regular bullion shipments have been made from time to time, and the attachment was quite a surprise to many people who know the value of the property. A large portion of the indebtedness is owing to the employees in various sums.

GOLD BASIN.—*Mohave Miner*, Jan. 17: Henry Schafer is in from his Gold Basin mines. He informs us that he has a ledge opened up to a depth of 180 feet, which averages \$65 in gold per ton. The ledge is three feet in width. At the Etta and Jonathan Mr. Cummings has out a carload of his rich ore ready for shipment. These two claims are Mr. Cummings' little bank, from which he draws his regular little "pile" whenever he feels so inclined.

TUNNEL.—Wm. Frost and Wm. Morrison are driving a tunnel to cut the vein on a claim they have located near Antelope wash in Maynard district. They have struck some very hard rock, but expect to cut the vein in about 20 feet more, when they look for rich ore. John Tillman, Ed Gilbert and L. Kimerly left on a three months' prospecting trip to the Santa Maria and Harqua Hala country Tuesday. Mr. Gilbert is well acquainted with that country and is in hopes of discovering the source from whence the placer gold found in that country comes.

THE GOLD BASIN mill will probably start up the first of February. A thorough sampling of the mine showed an average assay value of \$15 per ton for a width of 18 inches. It is claimed that the ore can be mined and milled for \$8 per ton, leaving a good margin of profit for the owners. The probability is that the company will also purchase a mine of Judge Schaefer, and with these two mines will be able to make a success of their mill. The cold weather has forced the lessees on the C. O. D. dumps to cease work. We understand that about \$30,000 have been taken from the dumps in the last ten months.

BRITISH COLUMBIA.

TRAIL CREEK ORE SAMPLED.—*Nelson Miner*, Jan. 10: Conflicting reports are heard as to the value of the ores of Trail Creek camp. One report is that the ore is too refractory for possible treatment; another that it will pay if the quantity said to be, is actually in sight. N. Hoover of Nelson has done as much as any other one man to test the merits of the district. He and his partner have men at work on the Lily May, and a shaft is now down over 30 feet, with 3 1/2 feet of ore in the bottom. Some time ago Mr. Hoover sent an average sample of the ore to the Northern Pacific Reduction Co. at Spokane Falls, to ascertain if it could be shipped at a profit. Advice from that company are in effect that the ore contains 3 1/2 per cent copper, 7 1/2 per cent lead, 8 1/2 per cent zinc, 101 ounces silver, and \$8 gold per ton. For ore of like character the reduction company will pay 90 per cent of the lead and 95 per cent of the silver and gold, charging \$20 per ton for treatment, the ore to be delivered at Spokane, freight and duty paid. At these figures the ore would net the owners about \$50 a ton, over and above mining, transportation, duty, and reduction charges.

AN EIGHT-THOUSAND-DOLLAR SALE.—The owners of the Grizzly Bear and Silver Queen have effected a sale of these prospects to a representative of the Omaha smelting works. The terms of the sale are conditioned on crown grants being obtained for the ground. The Grizzly Bear has had considerable development work done on it; the Silver Queen little more than the amount required to obtain a crown grant. Both are believed to be spurs or offshoots of the Silver King ledge, the ore being of similar character. Eight thousand dollars is the price.

COLORADO.

CLOSED DOWN.—*Idaho Springs Gazette*, Jan. 17: On account of a shortness of water the Mattie mill was compelled to close down. It is expected that the weather of the past few days will increase the supply sufficiently to enable the plant to start up in a short time.

SMELTER.—We have it from the most reliable authority that the Omaha & Grant smelter will increase its capacity to 700 tons per day. The Globe smelting works have increased their facilities so that they can handle 500 tons daily. The capacity of the Argo works has also been largely increased. All this shows that they expect a largely increased output, and the improvements will be the means of creating better prices for ore all around.

DAKOTA.

HESTER A.—*Deadwood Pioneer*, Jan. 17: A force of men is at work on the Hester A., at Galena, under the superintendence of John Gherkin, and a good quality of ore is being taken out. The farther the development progresses, the better the mine appears.

RICHMOND.—The mill belonging to the Richmond company, at Galena, was all fixed preparatory to starting up yesterday, but when the engine was turned loose the driving rod broke, necessitating shutting down. A new rod has been sent for from Fremont, Neb., and as soon as this is received, which will be in about ten days, the mill will be started up. The ore all comes from the Richmond mine, and a large enough body is in sight to keep the mill running continuously. Some of the ore recently struck will carry 600 to 800 ounces to the ton.

IDAHO.

GOLD ORE.—*Wood River Times*, Jan. 17: Herbert Hersley, of Soda Springs, whose company owns a 40-stamp gold mill which crushes from 120 to 150 tons per day, which yields \$5 per ton, says that it costs one-half of this, or \$2.50 per ton, to mine and mill. The vein is quite large and the ore soft. Instances where it costs less than \$1 to mine and mill abound in California. With this knowledge of the cost of operations elsewhere it seems to us that the parties interested in our Gold Belt should be able to approximate it. To be sure they are not supplied with the proper appliances to work at as low cost as in California or even in Cariboo; but the grade of ore is much higher here than it is there, and this should more than offset the advantage derived from the use of water-power for which a heavy rental has to be paid.

FROM LOST RIVER.—*Ex-Sheriff Furey* is in from Lost River. The Big Copper Co. is working its mines and smelter at Cliff with satisfactory results. The smelter was blown in a week before Christmas, and has been running uninterruptedly, and regular shipments of bullion to the railroad have begun. The smelter demonstrates that the ore is of much better grade and carries a much higher percentage of copper than was expected. About 100 men are employed about the mines and smelter. The Grand Prize mine, adjoining the Big Copper group, was sold for \$20,000 cash about one month ago. Mill. Brown is the superintendent, and about 20 men are employed. The company being amply provided with funds, it will develop its mine, having test lots of ore smelted occasionally, with the intention of eventually putting in a smelter.

THE DOLLARHIDE GROUP.—*Ketchum Keystone*, Jan. 17: Mr. A. Dollarhide is a large owner in the Dollarhide group of mines, situated at Smoky, and the present showing made by the property is highly encouraging. They have run three tunnels lengthwise of their vein, each one below its predecessor, the lower one of which at its farthest point in the mountain is about 400 feet below the surface of the hill. In the lowest of these tunnels ore is found for a distance of 140 feet, and the chute or chimney it is in is not connected with another chute tapped by the two tunnels above, and from which all of their ore thus far shipped from the mine has

been taken; but it is thought 100 feet more of tunnel will tap the original chute. Both of the upper tunnels yielded good ore, as did several upraises made along their course. The walls are from 8 to 20 feet apart and are both of hard black rock, probably lime. The space between them is filled with gangue and clay, more or less interspersed with ore, while the ore seam proper is generally about a foot wide, but varies from 1 to 3 1/2 feet. The clay in which this is imbedded is so tough as to be difficult of removal, but slacks readily on being exposed to the sun, and has yielded by assay test as high as 135 ounces to the ton. Its average value is somewhere between five and eight ounces. The ore seam is mainly on the footwall, but the richest ore is found on the hanging-wall.

DE LEMAR BULLION.—*Idaho Avalanche*, Jan. 17: Sixteen bars of bullion, weighing in aggregate 25,740 ounces, were shipped from the De Lemar mine this week. The assay value of these bars has not been made public, but the fact is well known that the shipments from that mill run over \$3 per ounce, and it is safe to estimate the shipment, 30 days run of the mill, at \$80,000. The amount of high-grade ore shipped in sacks is said to have slightly exceeded the previous month, so that the last month of last year has proven the best producer since the mill started. At this rate there will be no necessity of drawing on the reserve fund to pay for the construction of the new \$750,000 mill contemplated. Build it as rapidly as they may, the current product of the mine will pay for it.

THE LAST CLEAN-UP of the Leonard mill, running on Phillips & Sullivan ore, has placed to the credit of that mine nine bricks weighing 100 pounds each and assaying a little over \$2 per ounce. This is the last ore that will be crushed from that mine until the roads are again open in the spring. The development work now going on already assures much bigger and more frequent shipments when they begin again.

COW CREEK.—Dave Farmer is now camped at Cow Creek, with men working some of the claims belonging to him and others in that new camp. All reports that come from there indicate that region will be a Mecca for miners and prospectors, next summer. A number of the claims now slightly prospected are showing up rich.

THE FLINT MILL is still producing rich concentrates, but not having been constructed for the purpose for which it is now run, there have been a good many delays and stoppages. Enough has been done, however, to prove that the ores of the camp can be cheaply and profitably worked into concentrates, and with cheaply constructed concentrating mills to work the large quantities of ore found in the camp, it has a bright future in store.

LOWER CALIFORNIA.

ALAMO.—*Cor. Lower Californian*, Jan. 15: We have had cold weather at Alamo for a week past, making it necessary to huddle around the camp-fires and fire-places. H. S. Sherard has a bond on the Tarantula mine for six months from the owners, Messrs. McCarthy & Martin, but the bond was given with the understanding that Russell & Rhodes had a previous agreement with the owners to work the Tarantula, and if they wished to retain the mine the bond was to be declared null and void, and Mr. Sherard was to be recompensed for any expense incurred in working the mine. Upon the return of Russell & Rhodes to camp they signified their desire to take the property in accordance with the agreement with McCarthy & Martin, and so Mr. Sherard has severed his connection with the Tarantula, after being recompensed by the owners. In the 12 days that Mr. Sherard worked the Tarantula he took out 47 tons of ore, some of which was very rich. He is now working the Richmond, which adjoins the Aurora. John W. Mitchell has his mill, the Manzanita, and with the added improvements which he is about to make, will soon have a busy scene about his camp. Col. Lane & Sons will run the Alamo mill and do their own amalgamating hereafter. This mill was lately leased to Col. Lane's former amalgamator, Messrs. Hjalworth, Sherard and Chas. Hossack are putting some rock through the El Paso mill from the Richmond gold mine.

MONTANA.

BUTTE AND BOSTON.—*Inter-Mountain*, Jan. 16: The smelters of the camp are all running to their full capacity and their output of copper matte and copper is weekly on the increase. The only trouble experienced has been the inability of the many smelters to reduce the amount of ore produced, thus keeping some of the mines partially inactive. The Butte and Boston people are adding daily to their already great works, and the output of this company bids fair to outdo any smelter in the camp if the improvements are added as rapidly in the future as they have been in the past. The mines of this company are being opened up and in all of them the most encouraging prospects are being met.

THE SILVER DISTRICT.—As for the silver mines of the camp, all are running and every stamp dropping, and the usual shipments of bullion are regularly made from each company. The underground developments in the Lexington are simply immense, and the ore body on the 1500 continues as strong as at the time it was first crosscut. Extra good ore is being taken from the 11, 12 and 13 of the Alice, while the Moulton Co. only waits the reports of the developments as they progress in both the Alice and the Lexington, that they themselves may be tempted to sink below their present depths. The Gray Rocks and the Belle of Butte continue to be the main source of supply for the Silver Bow mill, and from these mines there is taken some of the richest ores produced in the camp.

ZOSOL DISTRICT.—*Montana Mining Journal*, Jan. 17: Operations have commenced on the Bridge street ledge in Zosol district. It is the intention to run a tunnel 150 feet for the purpose of tapping the ledge at considerable depth.

ORE.—Considerable ore is being shipped to the East Helena smelter from the sampling works at Boulder, two carloads from that point being received at the smelter during the past two weeks. It has been reported and confirmed that the London mine at Neiha has developed an ore chute 750 feet in length, with every indication that it may extend the full length of the claim. This property has the "earmarks" of a great mine.

BONDED.—It is stated that Wm. Zosol has bonded the Carbonate Extension mine, located near

Deer Lodge, to Chas. Meader of Butte and J. C. Shaubert of Deer Lodge. The bond is for \$10,000 and runs for six months. Work on the property will be commenced at once.

ON THE GRANITE LEAD.—*Phillipsburg Mail*, Jan. 15: There appears to be great activity on the line of the great granite lead. The Bi-Metallic Co. is sinking a 3-compartment shaft on the Faony Parrell, and it is understood to be its intention to sink 500 feet before crosscutting. Farther west on the Zeus, sinking is still in progress, and yet farther west the Bi-Metallic Extension people are about ready to resume sinking and have machinery almost ready to move, having a capacity of 1000 feet. This company seems to have every confidence of finding rich ore, as they intend to sink 500 feet before crosscutting to the vein.

MINES OF MARYSVILLE.—Speaking of bonanzas, what's the matter with the Bald Butte? At its present rate of production it will soon make millions of several Helena men. The last mill-run aggregated \$14,500, an average of \$158 per ton. Pretty big, isn't it, for a mine that was once abandoned as played out? The papers are full of the Spotted Horse and it seems strange they have so little to say of the Bald Butte—a bigger bonanza and one lying right at Helena's door. Its development? It has 80 feet of levels on the 100 which expose an ore chute fully eight feet wide. The footwall has never been found yet, and the Lord only knows what will be opened up by the time they reach it. The main shaft is down about 150 feet and still going. It is the intention, I believe, to crosscut on the 200. I don't know anything about the company's dividends. Another may be declared soon, or the profits may be reserved for the purchase of the new 20-stamp mill, which I hear will be put in next spring. I do know that the Bald Butte is a bonanza, however, and one of the greatest in Montana.

OREGON.

MONTHLY DIVIDEND.—*Bedrock Democrat*, Jan. 14: All thoughts of dull times were last Sunday for a time dispelled by Supt. Oliver of the Baisley-Elkhorn mine who arrived in the city and, reining up his roadsters in front of the First National Bank, alighted and with some exertion carried within the output of the Baisley-Elkhorn mine for the past 20 days—two gold bricks weighing something over 500 ounces and valued at a little over \$8000. The bricks by this time have been forwarded by the bank to the United States mints for coinage, one to Boise City, Idaho, and the other to San Francisco.

UTAH.

MAMMOTH.—*Salt Lake Exchange Journal*, Jan. 3: There is hardly a producer in Utah but that is steadily increasing its dividends right along. From every camp, almost, the ore output is doubled or quadrupled. The Mammoth mine, in Tintic mining district, is an illustration of what the mines of Utah are doing for their shareholders. During the past four years it has paid \$720,000 in dividends as follows: 1887, two dividends, \$20,000; 1888, five dividends, \$50,000; 1889, six dividends, \$130,000; 1890, 14 dividends, \$520,000. Total, \$720,000. This is a splendid showing, and the mine grows richer as development work progresses. In this property pure horn silver is found in large quantities, and gold ore, over half pure, is often encountered. Charlie Stehbins, the new superintendent of the Mammoth, will have a chance now to bring his large mining experience into full play, and by Jan. 1, 1892, we shall expect to chronicle a greater increase in its dividends than that noted above, as the Mammoth is as yet virgin soil.

Blind Requests.

It is surprising how thoughtless and careless some persons are in remitting money to newspapers, and in making requests in regard to changing the address of their papers. Almost every week some "blind" requests and blunders reach us, resulting from oversight and carelessness on the part of those who send them.

It is a common thing for us to receive requests like the following:

"Please change my paper to Blankville, as I have gone there to live. Yours truly, JOHN SMITH."

But as "John Smith" failed to give us his former or present address, we cannot make the change he requests without searching over thousands of names on our mail list—a work that would require a week to accomplish; and as there are many John Smiths, it would probably be unsuccessful in identifying the one sought after, even if the search were made.

Some persons request us to send their paper to such and such a place, not only without giving their present address, but even without giving their names. Of course, not knowing who the writer is, nor where he receives his paper, we cannot make the change he requests, and must wait until he writes again to complain that his former request has not attended to. But this was entirely his own fault. If he had sent in his name and former or present address, his request could and would have been promptly attended to.

Sometimes persons remit money in letters, and with similar carelessness neglect to give their address or name. In such cases we cannot enter credit for the money thus blindly sent us until we are subsequently informed from whom it came by the person who sent it and who complains that he has not received credit for his remittance. Of course, the delay in crediting the money was caused by his own carelessness.

It is the custom of printers to call all defective, disconnected, mislocated and unintelligible manuscript, or portions of it, "blind," and the term is appropriately applicable to the kind of requests sent us which we have cited above. They are "blind" requests and cannot be attended to for the reasons stated.

We hope, therefore, that all our friends will hereafter exercise a little thoughtfulness and care in this matter, and whenever they remit money to us, or desire us to change the address of their papers, we beg them always to state the postoffice, county and State to which their paper is now sent, as well as the one to which they wish it sent, together with their full name, and their requests can then be complied with. In short, we beg them to send us no more "blind" requests.

MECHANICAL PROGRESS

Friction and Lubrication of Journals.

Prof. John Goodman points out that the friction per square inch of a journal thoroughly lubricated, and so running upon an oil film, is within limits, independent of the load. The limit is imposed by the pressure which the oil film will bear without being squeezed out and allowing the metals to come into actual contact with each other. At low speeds, however, the friction is greater than at high speeds, and it has been found to decrease gradually till the surface speed of 1000 feet per minute is attained, when it varies very slightly, being, in fact, practically constant for a considerable range. This is true, however, only for considerable loads per square inch, such as 400 pounds, the area of the journal being estimated by multiplying diameter of shaft by length of bearing.

At loads under 60 pounds per square inch, according to Goodman, the friction gradually decreases with a reduction of speed, but when the intensity of the load is greater than this, the friction increases when the speed falls below 50 feet per minute. With low speeds, a load greater than 60 pounds per square inch seems to squeeze out the lubricant and to increase the friction. The experiments elicited one interesting fact well known in practice to railroad engineers, namely, the effect of slight side-play in reducing the friction of a journal. A journal with a slight side-play, and moving from side to side, has greatly less friction than one in which the side-play is entirely taken up. It is, of course, impossible to allow any great amount of side-play to the crank-shaft of a steam engine, but still this fact proves how advisable it is to fit main brasses and connecting-rod brasses slightly easy, and explains the heating which is often caused by too good a job being made of the side fit.

A constant load must be less in intensity than an intermittent one; thus a dead load such as is usually allowed on railroad axles, should not exceed 450 to 500 lbs. per square inch, while in crank-pins, where the load is intermittent, a maximum of 2000 lbs. per square inch is often applied without heating. On the gudgeon ends, where the sliding velocity of the surfaces is not high, as much as 5000 lbs. per square inch is allowed. The load, however heavy, takes some time to squeeze out the oil film, and so a heavy load only momentarily applied and then reversed does not get time to bring the metals into actual contact, although a smaller load continuously applied is quite able to do so. The whole efficiency of the journal depends upon its support upon this lubricating film, and the friction is caused, not by the contact of the metal surfaces, but by the continuous work of shearing the oil film existing between those surfaces. It is very interesting to reflect that the efficient working of our great engines depends on a lubricating film of from 1-10,000 to 4-10,000 of an inch thick, and furnishes one more illustration of the minute matters to be examined into before we can be said to understand the simplest actions of those great machines.—*Ex.*

GROWTH OF THE STRUCTURAL IRON TRADE. The impression has been created, by the rapid increase in the number of large fireproof buildings in our leading cities, that the consumption of iron and steel beams must have developed at a tremendous rate. So far as we can learn, that is not the case, the production being at the rate of about 100,000 tons per annum, while it was 90,000 tons two years since. As compared with the consumption of barbed-wire, tin-plate or nails, this quantity is very moderate indeed. It sinks into insignificance beside the demand for rails or pig-iron for foundry purposes. It has been urged that the consumption of beams would increase enormously were the price lower. In Germany, where the demand is far more widespread, the beam manufacturers have adopted a simple method of introducing their wares. The village builders have been accustomed to follow certain rules based on experience for determining the dimensions of the timber used for certain spans. The rolling-mills get out hooks giving the exact equivalents in strength of the different sizes of sticks of timber so used, with the price of the steel beam, delivered. Thus the small builder is placed in the position to tell at a glance whether it is cheaper for him to supplant wood with steel. It is reported that the consumption for small buildings has grown in an extraordinary degree. Still, we question whether such a result could be reached in this country, because the relative cost of timber and steel is quite different. How it will be upon completion of the increased capacity for manufacturing beams now being provided, is another question. The trade looks forward to a lowering in prices when the additions to plant are completed.—*Metal Worker.*

A NEW IDEA IN THE MANUFACTURE OF TUBING.—A new idea has been worked out in the manufacture of tubing in the construction of a flexible tube for conveying gas, steam or liquids under considerable pressure. This tube has sufficient flexibility for all practical purposes, with the additional advantage of great strength and durability. A triangular wire is pressed between the coils of a round wire during the process of constructing the tube with sufficient force to spread them apart, so that the contact surfaces are at all times under pressure. The triangular wire serves two purposes;

one is to spread the coils apart, so that the pressure will be exerted on the contact surfaces; the other is to fill the irregular shaped spaces between the coils of the round wire, adjusting itself to the changing form of the spaces caused by any given flexion.

WHAT MOLDING SAND SHOULD BE.—The mold has an important function to perform in the process of casting. It must resist the pressure of the liquid metal in every direction, and at the same time give a free escape to the air and gases generated in the mold while being filled, and during solidification. It must give to the casting a clean smooth surface, and allow an easy separation from the sand. It must neither act chemically upon the liquid metal nor be affected by it at the high temperature at which it is brought in contact with the sand. The higher the temperature of the liquid metal, the more difficult it is to comply with these conditions, and the fewer are the substances which can be used for this purpose. The presence of three per cent metallic oxides in molding sand impairs its refractory qualities. Still more undesirable is the presence of lime, one per cent of which will make sand undesirable for good castings. Lime present as a carbonate gives off its carbonic acid gas at the temperature of liquid iron, causing the latter, when in contact with the mold, to form bubbles and air-passages which destroy the smoothness of the surface. If present as caustic, it will vitrify and adhere to the face of the castings. The best molding sands are those that contain the largest proportion of silica; from one to three per cent magnesia; an entire absence of lime with sufficient alumina to render the sand cohesive and plastic. Sands of the above description are seldom found in a natural state.—*Iron and Steel Manufacture.*

THE BEGINNING OF IRONMAKING IN AMERICA.—Mr. Durfee gives some interesting information on the beginning of ironmaking in the United States. In "Early Steps in Ironmaking," he states that it is certain that at Lynn, in the Province of Massachusetts Bay, was cast, in the year 1645, the first piece of hollow-ware made in America—"a small iron pot capable of containing about one quart." This pioneer of all American-made castings was in existence in 1844, but recent efforts to ascertain its whereabouts have been unsuccessful. The works at Lynn appear to have been prosperous for a number of years, but after a time they became unpopular, owing to the flooding of lands by the breakage of the dam and the great destruction of timber for fuel. Rev. Wm. Hubbard, writing in 1677, says that they were "strenuously carried on for some time, but at length, instead of drawing out bars of iron for the country's use, there was hammered out nothing but contentions and lawsuits." After the establishment of this first successful "furnace" and "foundry" at Lynn, works for the manufacture of iron were erected in other parts of New England, and thence the business spread into New York, New Jersey, Pennsylvania and Maryland. During the French War (1755) there were a number of furnaces in operation at which "cannon, bombs and bullets" were made in great quantity, and many of these works furnished similar supplies to the continental army during the Revolution.

INGENIOUS MECHANICAL DEVICE.—Some valuable improvements have been made in faceplate jaws, so that, by providing recesses at each end for nuts, the jaws can be used on faceplates or plates having T slots, being then, of course, easily adjustable to any position in the slot by loosening the bolts. At the same time holes are drilled and tapped in the body of jaw, by which it can be attached to the plate in the old way, if desired. The jaws are reversible on the plate, the sliding jaws are reversible in the blocks, and the screws are reversible both in the blocks and of themselves, being squared for the wrench at both ends. The sliding jaws have parallel grooves the entire length, and the bearings of the screws in them also extend the complete length. It is found that four of these jaws attached to the faceplate of a lathe, or to the table of a boring-mill or drill press, etc., make an excellent substitute for the chuck, especially for the larger sizes of the latter, and to which they are on many accounts preferable. The jaws may be put on and taken off the plate very easily, one man doing the work alone and without the aid of any tackle.—*Boston Journal of Commerce.*

MITSUBISHI METAL has been found by Prof. Silvanus Thompson to be far superior to ordinary cast-iron, and not much inferior to wrought-iron, for electro-magnets. Its great advantage for the cheaper forms of dynamos and motors is that it can be easily cast to the form required, and the expensive forgings avoided that are now necessary with wrought-iron.

WEIGHT AND POWER.—It is said that Mr. Maxim, the inventor of the "Maxim gun," claims to have constructed an engine of 500 horse-power, weighing only 1100 pounds, or 2.2 pounds per horse-power. Some of the larger and most efficient engines have about 112 pounds dead weight per horse-power, including water.

IN A TEST OF STEEL at the Carpenter Steel Works at Reading, Pa., last week, an inch bar broke at a strain of 233,333 pounds—20,000 pounds in excess of the best record heretofore made.

SCIENTIFIC PROGRESS.

Can Plants See?

The candid observer must admit that many plants act as if they had the faculty of seeing. At any rate, they manage to find food and support by some special sense, which the unscientific mind cannot name any better than to call it sight. Mrs. King describes a very curious instance of this habit of looking out for support on the part of a creeping plant in India.

"My husband has broached a theory that I cannot remember to have met with before, namely, that creeping plants can see, or at any rate have some faculty equaling sight. He was sitting in the veranda with one foot up against a large pillar, near to which grows a kind of convolvulus. Its tendrils were leaning over into the veranda, and to Robert's surprise he presently noticed that they were visibly turning toward his leg. He remained in the same position, and in less than an hour the tendrils had laid themselves over his leg.

"This was in the early morning, and when at breakfast he told me of this discovery, we determined to make further experiments. When we went out into the veranda the tendrils had turned their heads back to the railing in disgust. We got a pole and leaned it up against the pillar, quite 12 inches from the nearest sprays of convolvulus.

"In ten minutes they had begun to curve themselves in that direction, and acted exactly as you might fancy a very slow snake would do if he wished to reach anything. The upper tendrils bent down and the side ones curved themselves until they touched the pole, and in a few hours were twisted quite round it.

"It was on the side away from the light, and excepting the faculty of sight, we can think of no other means by which the tendrils could be aware that the pole had been placed there. They had to turn away from the light to reach it, and they set themselves in motion visibly within a few minutes of the pole's being there."

Tanning by Electricity.

We recently gave, in these columns, an account of some experiments wherein it was claimed that by the use of electricity, the time for tanning leather was greatly shortened, whereby an important economy in the process was secured. The process, if we rightly recollect, was of German origin.

More recently an agent of the inventor visited New York with the view of introducing the invention to our American tanners. As no one seemed inclined to take it up on the representations of what it had accomplished in Europe, it was finally agreed to submit it to a test, under the joint direction of Mr. J. S. Schultz, and the agent at Newark. The test as described by the *Shoe and Leather Reporter*, was conducted as follows:

"Prepare two circular revolving vats. Into each of the vats shall be placed a given quantity of extract liquor, and the same number and quantity in pounds of prepared sides. In short, the conditions shall in all respects be equal. To the one vat shall be added the electric current and to the other there shall be no electric current. After revolving these vats for a sufficient time to tan the sides accompanied by electricity, they shall be taken out. If, on examination, the side in the vat which has not had the advantages of electricity should require more time, such time shall be taken and credited to the account of electricity."

The agent finding that this was the only course left to him, agreed to the conditions, and the experiment was tried at the factory of T. P. Howell & Co., of Newark. The result was exactly what Mr. Schultz had anticipated. It was shown conclusively that the revolving vat which was not subject to the electrical current, tanned leather as fast and as well as the other.

To sum up the whole matter, the vats of the tanners can be propelled by electricity or without it; there is no harm done if it is used, nor any good done if it isn't used. We have two specimens of leather before us, says the *Reporter*, one tanned electrically, the other not; the same time was employed on the production of each; the latter is fully as well tanned as the former—if anything, a little better.

DISSIPATING THE ENERGY OF A TORNADO.—Prof. H. A. Hazen, in *Science*, discusses the possibility of dissipating the energy of a tornado by artificial means. He is of the opinion that serious damage may be warded off from a town or a village by an extensive forest to the west and southwest. The electric tension might also possibly be relieved by a properly arranged network of wires and poles placed in the direction of usual approach. "A tornado is exactly the same as a waterspout at sea," he says, "and if ships have broken up such a spout from the concussion produced by the firing of a cannon, there seems no reason why the energy of a tornado may not be largely diminished by the explosion of gunpowder or dynamite."

ALL FORMS ARE CELLULAR.—All life is cellular; this is true of the lowest plant and of the most highly developed animal. In the unicellular organism all the functions of life must be performed by the one cell; it must absorb, digest and excrete. It must fecundate and reproduce its species. As we ascend the scale of

development we find a greater number of cells in the body. Not only do the cells multiply in number, but there is a division of labor among them, and the more marked this differentiation becomes, the higher stands the organism. In man, some cells take upon themselves the duties of digestion, others, that of elimination; some are concerned in locomotion, others in cerebration; others reason from the facts thus recognized. Communities of cells, engaged in the performance of a certain duty or duties, constitute an organ; and these, with their paths of intercommunication, form our bodies. Health is maintained only when each of these various communities of workers does its duty fully. If the pancreas fails to elaborate its proper secretion, the food does not undergo the normal digestive changes, and the liver, the heart, the lungs, the brain, and in short, the whole mass, becomes diseased or out of health.

THE FORCE OF VEGETABLE GROWTH.—Numerous are the evidences of the power of vegetable life in overcoming obstacles in the way of its growth. Grain dealers and warehousemen tell of wheat and barley blades growing through wooden flooring, and some men declare that grain will sprout and grow through a layer of asphaltum. But one of the strongest evidences of the strength of vegetable life is told in a late issue of the *Stockton Independent* as follows: There is to be seen at Russell's stables, in this city, mushrooms which are pushing themselves up through three inches of concrete and two inches of bituminous rock covering, which was laid hot and rolled smooth with heavy iron cylinders. In the rear portion of the stables, where vehicles are kept, the concrete and bituminous rock flooring was laid over ground which was at one time used as a corral. The floor was laid more than a year ago, and has been dry and solid until last week, when mushrooms began to push through and finally break the bituminous rock. Half a dozen mushrooms have come up since the bumps were first noticed in the flooring, and as many more have raised what look like large pustules in the black surface. Mr. Russell says barley sprouts came up through a portion of the flooring last spring, but he saw no mushroom growth there until about a week ago.

PHOTOGRAPHY APPLIED TO SURVEYING.—Surveyors are becoming more and more indebted to photography for the way in which it facilitates and improves their work. Progress is the order of the day. It is not long since the engineer who used a camera to take occasional or semi-occasional records of the progress of his work was looked upon as putting on airs. Now, however, the blue print and the camera come in very handy, so much so that it is not the engineer who uses them, but rather the one who does not, who is the exception. The engineer is not likely to dispense just now with his transit, but he who avails himself of such help as photography can give him, especially in such work as making close topographical surveys, will have a very great advantage over one who does not.

SINGULAR FACT IN CONNECTION WITH ESSENTIAL OILS.—The composition of all essential oils is one and the same. There is no chemical difference between them. Those of bergamot, birch, chamomile, caraway, hops, juniper, lemon, myrtle, nutmeg, orange, parsley, pepper, saffron, thyme, tansy and valerian, all have the same composition, expressed by the empirical symbol $C_{10}H_{16}$. The widely differing properties of these oils are explained by chemists as due to the different structure, or way in which the atoms are arranged in the molecule, just as the same number of bricks may be arranged to form a house, church, store, or many other different buildings.

STAR SPACE.—There is a photographic chart of the heavens now in course of preparation at the Paris Observatory on which it is calculated that sixty-four millions of stars will be represented—every one in its proper place in relation to all the others. In the nebula of the Lyre a photograph of only 4 by 5½ inches in area has been taken, which represents no less than 4800 stars. All these luminous points are so distinctly shown in the photograph that they may be counted by the naked eye. This is a greater number of stars than can be counted in the entire heavens by the unaided eye.

SUGAR FROM COTTON-SEED.—The latest reported discovery in connection with cotton-seed comes from Germany, where, it is said, a process has been discovered for extracting sugar from cotton-seed meal. The sugar is of a very superior grade, but cannot be sold in competition with the ordinary article. It is said to be inclined to ferment or sour, and hence, better in use for preserving fruits. It is said to be fifteen times sweeter than cane sugar and twenty times more so than sugar made of beets.

GEOLOGISTS have proven that the diamond mines of South Africa are located in vents or chimneys varying from 70 to 1500 feet in diameter, a fact which proves that the king of gems owes its origin to subterranean heat.

A LUMINOUS CRAYON has recently been invented to enable lecturers to draw on the blackboard when the room is darkened for the use of the lantern.

GOOD HEALTH.

HEALTH OF THE STATE.—From the circular issued by the State Board of Health for the month of December, 1890, just to hand, it is learned that the number of deaths in the State was 1196 out of an estimated population of 744,109. Of these deaths, 169 are attributed to consumption, 140 to pneumonia, 28 to bronchitis, 63 to diphtheria, 3 to smallpox, 31 to typhoid fever, 84 to heart diseases, 34 to cancer and 28 to alcoholism. The monthly percentage of deaths was 1.67 per thousand, or an annual mortality of 20.04, which is a higher death rate than that of the preceding month, and the highest death rate the State has had since January of last year, when influenza was epidemic. The increased death rate, the report says, was owing to the increase and fatality of diseases of the respiratory organs, including diphtheria and whooping cough. The three deaths from smallpox all occurred in this city. In concluding its report, the State Board of Health says: We desire this month to call the attention of every health officer to the necessity of having all premises containing or having contained cases of infectious disease properly fumigated and disinfected under their supervision, and to discourage or, if possible, forbid the holding of a public funeral in every case of scarlet fever or diphtheria. Day by day we are called upon to record cases of disease contracted in this way. A general law should be passed making it a penal offense to fail to notify the public, by some distinctive flag or notice, of the presence of communicative disease, and any one holding a public funeral where the cause of death is infectious should be severely punished.

HOW TO AVOID CHOKING.—Death by the clogging of the windpipe is an accident liable to happen to hungry persons eating hastily or to children, and calls for the greatest self-control and presence of mind on the part of those who are present. The substance which causes the choking may either be at the top of the throat, at the entrance to the gullet, or lower down. If at the upper part of the throat, prompt action will often remove it, either by thrusting the finger and thumb into the mouth and pulling the obstruction away, or, if it cannot be reached so as to pull it away, a piece of whalebone, a quill or even a penholder—anything at hand—should be seized and pushed down as a probang, so as to force the substance down the gullet. Tickling the back of the mouth with a feather, so as to produce violent retching, will sometimes dislodge it, or a sudden splashing of cold water in the face, which causes involuntary gasping. Should the patient become insensible before relief can be afforded, it must not be assumed for certain that death has taken place, and such remedies as dashing cold water in the face and on the chest and applying ammonia to the nostrils should be continued till medical aid arrives.—*Chicago Herald.*

ACIDITY OF THE STOMACH.—This condition is due to germs, and the cure lies in getting rid of the germs. Germs of fermentation in the stomach produce, first, alcohol, then carbonic acid, and then acetic acid. A person troubled with this form of dyspepsia should be careful to take only such articles of food as do not favor the development of germs, and thus starve them out. Another thing to do is to wash the germs out of the stomach by drinking freely of hot water before meals. If food is put into a stomach already sour, of course fermentation will be set up immediately. Some persons notice that as soon as they eat, their stomachs become sour. The third important thing to do is to stimulate the stomach to make more gastric juice, which is a natural antiseptic, and prevents fermentation, and also hastens absorption. The glands may be stimulated by applying hot fomentations to the stomach for half an hour immediately after the close of a meal, or easier still, by wearing a rubber bag filled with hot water directly over the stomach for half an hour or an hour. Heat is a natural stimulant, and there are no possible ill effects from its use in this way.—*Good Health.*

PRECAUTIONS AGAINST CONSUMPTION.—In a circular on precautions against consumption, published by the State Board of Health of Pennsylvania, the following advice is given: The duster, and especially that potent distributor of germs, the feather duster, should never be used in a room habitually occupied by a consumptive. The floor, woodwork, and furniture should be wiped with a damp cloth. The patient's clothing should be kept by itself, and thoroughly holed when washed. It need hardly be said that the room should be ventilated as thoroughly as is consistent with the maintenance of a proper temperature.

INTELLECTUAL WORK.—"It is not intellectual work that injures the brain," says the *London Hospital*, "but emotional excitement. Most men can stand the severest thought and study of which their brains are capable, and he none the worse for it, for neither thought nor study interferes with the recuperative influence of sleep. It is ambition, anxiety, and disappointment, the hopes and fears, the loves and hates of our lives, that wear out our nervous system and endanger the balance of the brain."

USEFUL INFORMATION.

The Keely Motor Controversy.

The controversy concerning the Keely motor has been more or less ventilated in the newspapers lately, but generally in a rather misleading way. The following are the actual facts in the case, furnished from what appear to be authoritative sources: Mrs. Clara Jessop Moore, a wealthy lady of Philadelphia, has taken a great interest in Mr. Keely's experiments, not because of any monetary interest in the company, but because of her belief that Mr. Keely's work might prove to be of great scientific value. For some time she has personally furnished all the funds necessary for carrying on Mr. Keely's experiments and supporting him and his family. The stockholders of the Keely Motor Co. desire financial results first and care nothing for the scientific aspect of the case. They desire Mr. Keely to continue to work away on his "commercial engine," which has thus far proved such an *ignis fatuus*, and abandon researches into the nature of his unknown force. Mrs. Moore has made, therefore, the following proposition to the company: That they shall cease all interference with Mr. Keely and permit him to pursue his experiments under the direction of Prof. Hertz of Bonn University, Germany, who is among the foremost of living physicists; Prof. Fitzgerald of Trinity College, Dublin; Prof. Barker of the University of Pennsylvania, and other noted scientists whom Mrs. Moore has interested in Mr. Keely's work. If they will do this until such time as Mr. Keely's work can be placed on a sound scientific basis, Mrs. Moore agrees to furnish all funds necessary for the experiments.

It is greatly to be hoped that the managers of the Keely Motor Co. will have common sense enough to accept this magnificent offer; for there is small hope of the commercial success of their company unless the experiments which Mr. Keely now blindly performs are placed on a scientific and intelligible basis, provided this is possible.

Another Statement.

Notwithstanding the above, the following is another statement quite the reverse: Mrs. Moore, who, since the capital of the Keely Motor Co. gave out, has been supplying funds to the inventor with which to perfect his invention, now proposes to retire from the concern, and Keely will have to look around for some other means of earning an honest living. It is now 20 years since Keely announced to the world the discovery of a new force, with which he was going to revolutionize the whole system of propulsion and locomotion, and even Mrs. Moore cannot be blamed if her confidence begins to move.

Keely's Rival.

The little town of Weston, W. Va., claims to have a mechanic who has invented a machine which rivals the famous Keely motor. It is claimed that a system of mechanism has been discovered by him, whereby one man with a 14-inch lever can create five-horse power. This is equivalent to raising 33,000 pounds five feet high in one minute, or to raising 165,000 pounds one foot in one minute, or in the same length of time to raising 1000 pounds 165 feet high. It is equal in power to raising a one-pound cannon-ball at 30 miles a minute, or double the speed of a rifle-ball.

The machine is now on exhibition in a shop at Weston, where, those who have seen it say, it keeps a rip saw which requires five-horse power in steady operation. The inventor claims that the force can be applied instantly to any object, making it useful for throwing projectiles.

ELEPHANT'S HIDE.—The tanning of elephant's hide is comparatively a new industry. The method employed is practically the same as in the tanning of cow hides, except that a stronger combination of the tannic ingredients is required, and a greater length of time, about six months, is necessary to perform the work. When the hide is taken out of the vat, it is about 1½ inches thick. Articles made of elephant's hide are expensive luxuries. A small pocket-book made of elephant leather, without any silver or gold ornamentation, costs about \$40. A small satchel made of the same leather costs anywhere from \$300 to \$400. Cigar cases, card cases and similar articles vary from \$52 to \$100. Floor rugs are also made out of the leather. In finishing the hide no attempt is made to glaze or polish it. Everything is done to preserve its natural color and appearance. It is a very durable leather, several years' wear having but little effect on it. The scarcity of elephants and the great expense entailed in the tanning of their hides precludes the possibility of elephant leather ever becoming a thing of popular and general use.

A RAILROAD SAFETY CAR.—A new invention is that of a collapsible railway car in which the principle of air-cushions is applied to prevent dangerous accidents in case of collisions. The car will be in two compartments, one larger than the other and empty, so that when a collision occurs the smaller section will be forced into the larger, the air in which will act as a cushion and relieve the occupied section of the sudden shock.

A NEW USE FOR HOPS.—A new use is reported to have been discovered for English hops—namely, for the curing of bacon. It is

found that a sprinkling of hops in the brine when bacon and hams are put in pickle, adds greatly to the flavor of both, and enables them to be kept for an indefinite period.

ENGINEERING NOTES.

Some Ancient Engineering Feats.

The hard mechanical training necessary for an engineer of the present day disinclines him to spend his scanty leisure in studies which cannot be turned to account. The result is that he conscientiously believes his art to be the special flower and glory of the age—in which he is not altogether wrong; but beyond that he regards all earlier feats of engineering as unworthy of serious discussion, and the public, as ignorant, with less excuse, encourage this view.

It is waste of time to ask him how the bowlders of Stonehenge were conveyed to their resting-place, how the walls of Fiesole or Mycenae were built. These marvels represent the power which lies in the brute force of multitudes, and there's an end of the question. Engineering now is an art and a science, with which the rude work of the savages has no sort of connection. One must not inquire why he takes it for granted that Stonehenge, for example, was built by savages, where the brute multitude came from, how they subsisted on Salisbury Plain, or why it is necessary to assume that they were unacquainted with mechanics.

All that is beyond dispute. If you cite records of antiquity which tell of works he cannot rival, that fact alone is proof that the record is a lie; for how can it possibly be that mere Greeks and Romans should have been able to do what the builders of the Eiffel Tower and the Forth Bridge cannot accomplish? We had an amusing instance of this feeling lately. The ingenious M. Eiffel and the artistic M. Bartholdi have been gravely pondering the Colossus of Rhodes—measuring and weighing it as per description, and they conclude that the thing was simply impossible.

It could not have been set up, to begin with, and when set up it could not have stood the pressure of the wind. This is demonstrated by all the rules of modern science, and he who does not admit the demonstration must be prepared to show that two and two do not make four. Those antique personages who professed to have seen the Colossus were victims of an ocular delusion or flat story-tellers, and that greater number who mentioned it incidentally, as we might mention the ruins of the Colosseum, were credulous gossips. The fact is that Messrs. Eiffel and Bartholdi argue in the fashion usual with engineers. Not all of them would pretend that they know every law of nature which applies in such a case. But very few would listen patiently if it were urged that the ancients knew some laws with which they were unacquainted.

So it appears, however, to the disinterested student, and we can bring forward evidence enough. If it be true that the Colossus of Rhodes is really proved "impossible," according to the best modern authorities, this is a good illustration to begin with, for its existence is as well authenticated as the temple at Delphi and the statue of Olympian Zeus, or the Tower of London for that matter, to one who has never seen it. By some means it was set up, and by adaptation of some natural laws it was made to stand until an earthquake overthrew it. One is embarrassed by the number and variety of illustrations to the same effect which crowd upon the mind. Since the Colosseum has been mentioned, we may choose examples of this class. Is M. Eiffel prepared to put an awning over Trafalgar Square when the sun shines, and remove it promptly without the aid of a central support or steam engine, or even chains? The arch of the Colosseum is certainly not less. This may seem a trifling matter to the thoughtless, because they have never considered it. Roman engineers covered in that vast expanse with some woollen material, and they worked the ponderous sheet so easily and smoothly that it was drawn and withdrawn as the sky changed. The bulk of it must have weighed hundreds of tons, all depending by ropes from the circumference. But the ancients thought so little of this feat that they have left us only one trivial detail of the method.

So Julius Caesar stretched an awning above the Forum Romanum and a great part of the Via Sacra in the space of a single night. Have any of our modern engineers pondered the contemporary descriptions of Alexander's duhant tent before Babylon? That, again, appears to have had no central support. It was upheld, says Phylarons, by eight pillars of solid gold. Of the glorious plenishing within we have not to speak, since our theme is mechanics. Around the throne and the great courtiers stood 500 Macedonian guards; in a circle beyond them 500 Persian guards; beyond these again, 1000 archers. To fix a tent which held 2000 soldiers on duty, with arms and accoutrements, surrounding, in successive circles, the most gorgeous Oriental court that ever was, with hundreds of satraps, councilors, generals, eunuchs, and slaves, would perplex a mechanician of the nineteenth century. He will reply that the story is false—must be because he could not match it. Happily the awning of the Colosseum stands beyond dispute, and Alexander's tent is a small matter compared with that.—*St. James's Gazette.*

ELECTRICITY.

Danger From Underground Wires.

According to the views of some of our foremost electricians, says the *Sanitary Plumber*, trouble is likely to result from the hurrying of the electric conductors, if the high-tension currents are still employed. No insulation has yet been discovered that will remain for a long time intact and perfect, and it is pointed out that the ordinary insulating materials are likely to prove very short-lived when exposed to the effects of warmth and moisture in an underground conduit. It is proved by the frequent explosions that have occurred to be rendered additionally destructive by the presence of a large proportion of carburated hydrogen.

We are told that the rapid decay and disintegration of the insulation will enhance the dangers liable to result from an accidental contact of live and dead high-tension and low-tension current conductors, and that the line-men's perils will be aggravated greatly owing to this cause, and by reason of the confined space they will be compelled to work in. Gas that may escape into a conduit is almost certain to be ignited in short order, and the dangerous explosions that have startled the city (New York) are liable to increase in frequency. Worse than this, however, is the warning uttered by a leading electrical engineer, who calls attention to the fact that the escaping current of electricity is as likely as not to find in a water or gas main an avenue of escape, with the result of unpleasantly surprising any one touching branches of these conductors in turning on gas or water.

It is not our wish to pose as alarmists, but we quote pertinent facts that appeal to every citizen. If these currents prove so tremendously effective above ground, where they are, practically speaking, out of every one's way, what is to be said of their presence under our feet and in close contact with metallic conductors in constant use, that may possibly become charged with their deadly energy? It may be all very well to hurry the wires down from the poles, but before placing them where they may prove equally or even more dangerous, their location should be the subject of the most careful attention.

New Uses for Electricity.

Electrical science, says Prof. Elisha Gray, has made a greater advance in the last 20 years than in all the 600 historic years preceding. More is discovered in one day now than in a thousand years of the Middle Ages. We find all sorts of work for electricity to do. We make it carry our messages, drive our engine, ring our door-bell, and scare the burglar; we take it as a medicine, light our gas with it, see by it, hear from it, talk with it, and now we are beginning to teach it to write.

We give the following as among the latest devices in this direction: A Frenchman has perfected a contrivance which acts at once as a mosquito-bar and exterminator. It consists of fine copper wire woven so close as to exclude the insects from the bed. At the top of the canopy hangs a small electric lamp. This attracts the mosquitoes to the netting, where they are killed by a current from a weak pile battery under the bed, which also supplies the light.

A Riverside man has arranged an electric frost alarm which will be a great convenience to orange-growers. It consists of an accurate dial thermometer, electrically connected with a bell and switch in such a manner that it will cause the bell to ring when any desired temperature is reached.

The very latest item in this direction is that it is claimed that hogs should be killed by electricity, because the passage of the current not only kills the pig but kills trichinae at the same time. Whether this claim has any foundation in fact, we cannot say; but it seems plausible. If substantiated, the discoverer should be canonized as a great benefactor of the human race, and deserves of Congress a gold medal for a clear-cut solution of the international question raised by the American pig.

ELECTRIC RAILWAYS IN COLORADO.—Denver has already 30 miles of electrical street road in operation, employing an aggregate of 1150-horse power of generators, 58 motor cars, each fitted with two 15-horse power motors and 60 trailers, traversing the city and reaching out in every direction to suburban points. The old cable and horse-car companies are rapidly adopting what is apparently to be the motive-power of the future for all city and suburban traffic. The West End line uses double-truck cars 40 feet long and of 2000 pounds weight, fitted with two 15-horse power Sprague motors, this motor and overhead wires being in general use on all the lines. The Colorado Springs electrical main line, with branches, is 22 miles long and runs to Colorado City, the former capital of the State. The aggregate power of the generators of this line is 280 horse, employing 18 motor cars and a like number of trailers. Several new lines are in contemplation, and some in process of construction. All the lines are working well. Colorado leads the Union in this enterprise. San Francisco cables are doing well, but there is talk in some quarters of substituting electricity for steam and cables.



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A. T. DEWEY. W. E. EWER. G. H. STRONG.

SAN FRANCISCO:

Saturday, January 24, 1891.

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[NEW THIS ISSUE.]

Flax Packing—W. T. Y. Schenck.
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See Advertising Columns.

Passing Events.

Representatives of the hydraulic-mining interests have visited the Governor of the State and congratulated him on the sentiments expressed in his message. Their address is printed elsewhere in the PRESS. It would really seem as if the time had come when Congress will be forced to give attention to the question affecting this class of mining.

Miners should note that Congress is again amending the mining laws, and if there are objections to the bill now pending (published in another column), they should be made known at once.

One of the local foundries—the Occidental—has withdrawn from the Manufacturers' Association and has again employed union molders. It is not expected that this action will make any change in the status of the strike as far as the other foundries are concerned.

THE MULATOS MINE SUIT.—This matter has been settled. Hohart and Hayward get back \$1,422,000 of the purchase money (\$1,575,000) and reclaim all the output of the mine since the sale, in lieu of which they surrender the Mulatos mine to the Agnayo, who still retain \$153,000, which could not be reached by attachment.

Opals in Washington.

A discovery of opals has recently been made near Moscow in the State of Washington, close to the Idaho line. A number of the gems have been brought to this city and cut, showing a more brilliant play of colors than those obtained from Mexico. They are whiter and without the yellowish tinge of the Mexican gem. Some of them appear to be harlequin opals on which the patches of color are made angular and variously tinted but evenly distributed. Others show deep-green flashes of color, like those called lechoses by the Mexicans. One, a very large specimen, has been examined by a very skillful lapidary, and other competent parties, who are of opinion that it was the largest and most valuable precious opal in the rough that has been brought to this city.

The recent find was made in a wheat-field where men were digging a well, and at a depth of four feet they came upon this deposit. Specimens have been shown to us by Melville Attwood of this city. Specimens of basalt wacke, the inclosing rock, or matrix of the opal, came with the gems. Mr. Attwood has prepared a section of the matrix for microscopic examination by which he identified the substance.

No special work has been done on the claim this winter, owing to the snow, so that the extent of the deposit is unknown. Some of the gems are quite large and pure; and, in fact, all of them are of very good quality and quite handsome, excelling in beauty and luster those from Mexico.

Most of the opals come from Hungary, Honduras, Mexico and Queensland. Those from Hungary are the finest and most valuable. The Honduras mines are little worked, and the opals seldom reach the market. The opals of Mexico are well known throughout the world, although they do not rank in value or durability with those from Hungary.

It is not generally known that there are several places in the United States where opals have been found, most of them, however, small, colorless, and of little value as gems. Mr. G. F. Kunz, gem expert of Tiffany & Co.'s, New York, in his recently published work on "Gems and Precious Stones," speaks of opal showing a brilliant play of rainbow colors, either of the noble or fine opal variety, having been observed in the United States only, near John Day river, Crook county, Oregon. The specimen found there is transparent, grayish-white in color, with red, green and yellow flames. The play of colors equals in beauty any Mexican material, and it is the first opal found in the United States that exhibits color.

Mr. Kunz says that this strikingly resembles and has the absorptive properties of tabasheer, the variety of opal which is formed in the joints of the bamboo and which is used in India for medicinal purposes. "Undoubtedly," he says, "better material of the same kind exists where this is found."

A beautiful fire opal without any opalescence occurs in a small vein about one-fourth inch thick and two inches square from Washington Co., Ga. Common opal in small masses of greenish and yellowish-white color, with vitreous luster, are found at Cornwall, Pa., also at Aguas Calientes, Gibson Gulch, Idaho Springs, Colo., of a brownish color.

Prof. Wm. P. Blake, in his catalogue of California minerals (1866), wrote of a rich white variety of opal found at Mokelumne Hill, Calaveras Co., Cal., and on Stockton Hill, Chile gulch, opals were found in a thin stratum of red gravel at a depth of 345 feet. These stones were thought to have a market value, but really had none. A milky-white variety similar to these and without fire is found 30 miles south of Mt. Diablo, Contra Costa Co., also in the foothills of the Sierra at the Four Creeks.

Nothing, however, with the opalescent luster and fire of these Washington opals has, as far as we are informed, been found before in the United States. As to the extent of the deposit, that is yet to be determined.

Opal is a native amorphous hydrated silica, the same mineral as quartz with the addition of six or seven per cent of water. It is never found in a crystallized form, occurring in masses having a conchoidal fracture. It has a vitreous luster, sometimes inclining to resinous or pearly, and white, green, yellow,

brown or gray color, according to the foreign substances present. Hardness, 5.5-6.5; specific gravity, 1.9-2.3.

The varieties of opal are distinguished according to their color and other physical properties. Precious or noble opal, like the Washington, is generally white or colorless and exhibits a rich play of colors—green, red, blue and yellow of various shades. When large and exhibiting its iridescence in perfection, it is a very valuable gem. Fire opal is a transparent opal colored by hyacinth-red to honey and wine-yellow by ferric oxide; occurs at Zimapan, in Mexico. The common opal is of various colors, but without iridescence. The formation of opals is due to the solubility of amorphous silica in water, especially in hot water, containing carbonic acid, the silica being dissolved out by spring-waters from decomposed silicates and deposited under favorable circumstances in a state more or less approaching to purity.

Suburban Railroads.

Numerous franchisees for street railroads have recently been granted in this city and a number of extensions and changes on old lines have been arranged for. Means for rapid transit of an improved order are in demand as the suburban districts become more populous. The Market-street cable system, including the Geary and Turk street lines, has been granted franchisees of extension which will open up new residence areas or at least offer rapid transit to many blocks that do not now have it.

More attention is being turned to electricity as a motive-power, especially for outside suburban districts, as comparatively high speed can be attained with these cars. In cities in the East, especially the smaller ones, electric cars are largely in vogue and many horse lines are changing to electricity. Once outside a crowded thoroughfare, the electric cars can run quite rapidly. There is, however, much objection to the overhead wires which seem to be necessary to make these roads successful. The storage-battery systems are not as successful as hoped for, and where the wires have been placed underground, great difficulty has been experienced.

While several electric roads built in this State were failures, there is no reason that those of the future should be, since such a large number of them are operating all right elsewhere. All our cable roads here work satisfactorily, but there are instances of failure with these elsewhere. Lack of experience of the construction in such cases was the probable cause of failure.

The electric cars, even in such crowded thoroughfares as exist in Boston for instance, run in a perfectly satisfactory manner, and some of the present horse-car lines in that city will soon change to electricity. The cars can run very slowly or very fast, as occasion demands.

In some of our outside districts we might well follow the example of the Pittsburg cable roads. They have a cable running six miles an hour in the city proper, but on reaching the suburbs they change to another cable running 12 miles an hour. On this faster cable the cars only stop at certain stations, say two blocks apart, and one cannot well jump on or off while the cars are in motion. But by the system of two cables of different speeds, rapid transit for suburban places is attained.

As San Francisco, Oakland, San Jose, Sacramento and other cities of this vicinity grow, better means must be provided for the quick transportation of the inhabitants from place to place. Los Angeles is well provided in the matter of street transportation, its cable system being very perfect and extended. San Francisco, too, has a fine system of street transportation, but it needs outward extension. Oakland needs several more street railroads, and a few additional cable and electric roads have been planned or are being completed. The electric roads are more cheaply constructed than the cable, and it is likely that numbers of them will be built in this State in the future to accommodate the citizens of suburban localities. In time, probably, the overhead-wire nuisance will be abolished and some other plan of handling the electric current perfected.

In the work of draining the Gold Hill mines the Dow pumps are raising to the Sinto tunnel level 1000 gallons of water per day.

The Boston & Montana Co.

(Concluded from page 49)

whom the principal responsibility rests, is a native of England and has followed mining from childhood, first in the place of his birth, then in the Lake Superior copper mines, then in California—both gold and quicksilver—and from thence to the White Pine excitement, where he was in charge of the Hidden Treasure mine. After spending several years there, he emigrated to Utah, where he superintended several mines, and in 1881 he first visited Montana, and being favorably impressed, he decided to cast his lot here and take the chances of being successful. For several years he followed the examination and reporting on properties for the benefit of foreign investors, and by his fair and impartial judgment in this was quite successful in placing a number of good properties. In 1887 he made a report of the properties now included in the Boston and Montana company's mines, and was invited to take the management, which he consented to do. Since that time he has been indefatigable in his efforts to place the company's properties and plants in a proper shape to produce silver and copper at a profit. Every mine the company is operating is directly under his personal supervision, and with his life-long experience, he is familiar with every detail that he may come in contact with. In his responsible position this enables him to be completely master of the situation and capable of filling his important position even in the most minute details.

Mr. Couch has, during the past year, purchased and stocked one of the finest ranches in the State of Montana. His original investment in this was about \$50,000. This he has about doubled by adding thoroughbred stock. This property is on Sun river, a short distance from Great Falls.

The Boston & Montana Company, although only three years old, has already a dividend record that they may well be proud of. It started with a capital stock of \$2,500,000, and now at the end of the third year they have standing to their credit, notwithstanding the fact that they have been making large additions to their permanent improvements, and have been continually operating a large force on development work, \$1,300,000 in dividends. What mine in the country can produce better evidence of careful, shrewd, economical, painstaking management? Their large additional plant will greatly increase the general magnitude of the company's work, as 1000 tons of ore to be mined and shipped, in addition to what is already being mined, will mean a large increase in the force all around; and the activity that will of a necessity come from this will still further develop the capabilities of Butte mines. The stockholders of this property are showing their confidence in the continuity of the mining interests of Butte by investing a portion of their capital in local enterprises. The Lewisohn Bros. of New York purchased the J. M. Bowes lot, when the fire that came near consuming the city of Butte, on the 30th of September, 1889, originated, and now have an elegant block well under way, to be five stories in height, and on its completion will start a banking business. This all carries the inference that the developments on their explorations have been eminently satisfactory, and that it is their intention to bid for a portion of the magnificent future ahead of the "greatest mining camp on earth" in commercial lines, and thus profit by the reinvestment in Butte of a portion of the handsome dividends derived from the stock of the Boston & Montana Consolidated Copper and Silver Mining Company.

The Old Dominion Copper Co., Arizona, produced 7,720,015 pounds of copper, the largest amount ever turned out in one year. They smelted 27,885 tons of ore and used 7880 tons of limestone. The large compound Worthington pump has been started, so they will now more easily handle the water.

JUDGE HAWLEY of the United States Circuit Court has imposed a fine of \$5000 on the Omega Water and Mining Company for disobeying an order of the court by washing debris into the Sacramento river.

FRANK HAMMOND was killed in the Occidental mine, Virginia, Nev., on Wednesday. He was drilling where there was an unexploded "hole" the charge in which went off.

Frame-Work for Cable Railways.

Mr. Patrick Noble, Supt. of the Pacific Rolling Mills, has just patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, a novel construction of the yokes or frame-work by which the rails and slot-irons of cable railways are supported and united. In the accompanying drawings, Fig. 1 is a perspective view of a section of the railway, showing the invention; Fig. 2 is a transverse section; Fig. 3 is a plan view of the same in section; and Fig. 4 is a transverse section, showing a modification.

In the construction of cable railways, it is customary to unite the lines of track upon which the wheels travel and the parallel irons between which the slot is formed through which the grip-shank passes from the cars, by iron yokes made in various ways, said yokes being strongly braced and stayed, so as to maintain the tracks and slot-irons in their relative positions. In the ordinary construction these yokes are quite expensive, and Mr. Noble's invention is intended to reduce the expense of this construction. Each yoke is made as follows: *AA* are two angle-irons having sufficient length, so that when set up vertically they will extend from approximately the level of the top of the slot-irons to the bottom of the trench in which the cable-tube or tunnel is formed. *BB* are slot-irons which are secured to these vertical angle-irons by angle-pieces *CC*, bolted to the sides of the slot-irons and also to the vertical angle-irons *A*. The slot-irons *BB* are also shown in the present case as being made of angle-iron of sufficient thickness to give the necessary rigidity.

DD are the rails upon which the cars run, and these are bolted or secured to the chairs *E*, which chairs are in turn secured to the ends of the horizontal bars *F*. These bars *F* have their inner ends adapted to support the lower edges of the slot-iron and bolted to the vertical angle-iron bars *A* so that the two bars are united together. These frames are set transversely to the line of the track, at short intervals, and are solidly embedded in the concrete which forms the continuous tube or channel in which the rope or cable travels. For cheap construction, these are all the parts that are employed, and a continuous body of concrete *G* is filled into the trench so that the vertically arranged angle-irons *A* and the bars *F*, which connect these irons with the chairs upon which the track rests, are entirely embedded in the concrete. The flanges of the angle-irons *A*, which are parallel with the line of the cable tube or tunnel, are of sufficient width so that a considerable quantity of concrete surrounds them, and the transverse flanges are of such width that a considerable body of the concrete lies between the first-named flanges and the inner sides of the tube or tunnel, which is formed of the concrete. This body of concrete is of sufficient thickness to hold the vertical angle-iron *A* firmly in place after the concrete is set, and the whole forms a rigid and immovable structure which is sufficient for all the traffic of cars.

To increase the strength of yoke, chairs *E*, which support the tracks, may be connected with the lower part of the vertical angle-iron *A*, by diagonal braces *H*, which are firmly riveted to both, and taken in connection with the horizontal connecting-bars *F*, they form a strong triangular frame.

In order to still further strengthen the structure, the inventor shows one or two bars, *I*, which extend horizontally between the uprights *A*, to which they are strongly bolted or riveted below the line of the bottom of the concrete-tube or tunnel, so that when the concrete is filled in around the structure or frame-work these irons are all embedded in the concrete and form with it a solid and unyielding structure, which is capable of resisting any strain which is liable to come upon it. By this construction Mr. Noble greatly cheapens the road-bed and reduces the expense very materially, while producing a strong and permanent way.

It is asserted that quite \$2,000,000 was expended last year in making improvements on the Anaconda property in Montana. Notwithstanding, the four men who have an interest in the mine had \$3,500,000 to divide between them. It is estimated that this year the earnings will not fall short of \$5,000,000.

The rolling-mills of the Judson Iron Works at Oakland have closed down for repairs.



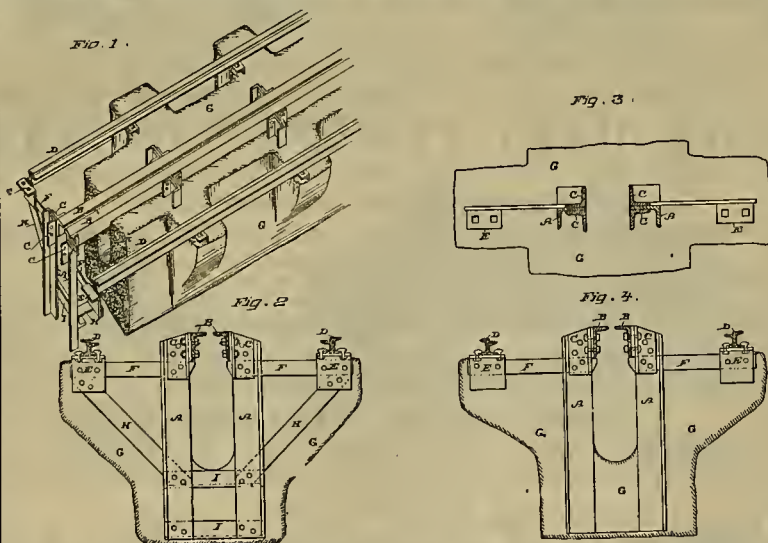
THE LATE DAVID KALAKAUA, KING OF HAWAII.

Death of the Hawaiian Sovereign.

On the afternoon of Thursday, Dec. 4th, the U. S. warship *Charleston* arrived in the Bay of San Francisco bearing David Kalakaua, King of Hawaii, as a visitor to California, and on Thursday afternoon, Jan. 22d, the same vessel departed, bearing his body to Honolulu. He came on invalid seeking recreation and hoping to find also restoration. He was received with marked hospitality, and, as far as his strength allowed, accepted and enjoyed the

as the Kingdom of Hawaii. He was a little over fifty-five years of age, having been born November 16, 1836. He was a son of Kapaakea and Keobokatoe. February 12, 1874, he was elected king.

King Kalakaua was brought more prominently before the people of the United States by his visit to this country in 1876, when he was well received by President Grant and by citizens generally. The object of this visit was to promote friendly relations with the United States and to secure the ratification of a Treaty



YOKES AND FRAME-WORK FOR CABLE RAILWAYS.

welcome extended to him as the representative of our neighbor nation in the Pacific. But his malady was evidently too deep-seated for cure; he became worse instead of better, and died on Tuesday afternoon, Jan. 20th.

The portrait upon this page gives a representation of this distinguished personage. He was the seventh ruler of what is now known

of Reciprocity by the United States Senate, in which he was successful. In 1881 King Kalakaua undertook a tour of the world, for the purpose of establishing pleasant relations with foreign Governments and to secure their consent to the emigration of their subjects to the Hawaiian Islands. This aim was also accomplished, the result being that a great immigra-

tion of Asiatic peoples occurred, and many subjects of Portugal were also introduced. During some years the Hawaiian kingdom developed under King Kalakaua's administration. The latter years of his reign were less peaceful than the earlier.

The State Mineralogist's Report.

The Tenth Annual Report of the State Mineralogist which has just been issued comprises nearly 1000 pages. With it is published a topographical and preliminary geological map of the State. The several most important geological characteristics have been defined on this map in colors, and many of the metalliferous deposits indicated by symbols.

The report includes "Geology of the Mother Lode Region," by Harold W. Fairbanks; "Ancient River Beds of the Forest Hill Divide," by Ross E. Browne; "Lead Smelting," by F. C. Von Petersdorff; "Mining of Gold Ores in California," by John Hays Hammond; "Location of Mines," by R. P. Hammond Jr.; "Introduction of Producer-Gas at the Marsac Mill, Park City, Utah," by C. A. Stetefeldt; "The Colorado Desert," by C. R. Orant; "Quicksilver Mines and Reduction Works," by J. B. Randol (a bulletin of the census); "Gold Extraction by Potassium Cyanide," W. D. Johnston.

In addition to these special articles, a chapter is devoted to the mining interests of each county of the State, this information being derived from notes by field assistants of the State Mineralogist. There is quite a number of illustrations.

This report is the most complete one yet issued by the Mining Bureau, and is supplementary, to a certain extent, to that of last year. The chapter by Ross E. Browne is a most valuable addition to the knowledge on the subject of ancient river beds, that gentleman having had exceptional facilities for observation. Mr. Hammond's article on the mining of gold ores is also a very valuable one, the best on the subject which has yet been published. State Mineralogist Ireland can congratulate himself on having given the mining public a very useful volume.

The Mulatos Mine Purchase.

EDITORS PRESS:—The purchasers of the Mulatos mine were not influenced by my report, made to a different company a year and a half previous, but acted on other advice. The examination was made under written instructions as to the price asked for the property and other matters, and even if my report had been different from what it was, its use, even nominally, was not authorized in connection with a state of affairs which did not exist when the report was written, the underground or main workings of the mine having caved from the surface down to the bottom level some time before the property was bought.

While the general results of the examination seemed to warrant the belief that the property was very valuable, I did not feel called upon to make positive estimates from data which were often not encouraging, and which I did not think sufficient, in view of the very great extent of ground which it was, in many instances, only possible to sample in a superficial manner.

The results of the sampling were not of a kind to excite suspicion at the time that the samples had been tampered with, although the fact seems now to be proven to some extent at least. Several of the small milling tests made in San Francisco of a mixture of equal parts of all the samples from extensive regions, showed a grade of ore which would hardly pay to work; and in other cases it was only by taking on equal terms the high assays from comparatively small areas that better general averages could be obtained. I called attention to this fact in my report.

The persons for whose account the examination was made have not been named, and I know that the recent purchasers were thoroughly cautioned against buying such a property without closer investigation.

ALEXIS JANIN

San Francisco, Jan. 21 1891

MINING COMMITTEES.—The California Senate Committee on Mines, Draught and Mining Debits is as follows: Voorhies (chairman), Fraser, Preston, R. H. Campbell, Mead, Dray, Ostrom. The House Committee on Mines and Mining Interests is composed of Hale (chairman), Lux, Hunewill, Freeman, Baughman, Kellogg, Robertson, Martin, Garver.

INDICATIONS of natural gas have been found three miles from Vallejo, Solano county.

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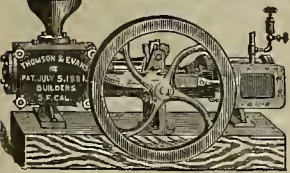
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COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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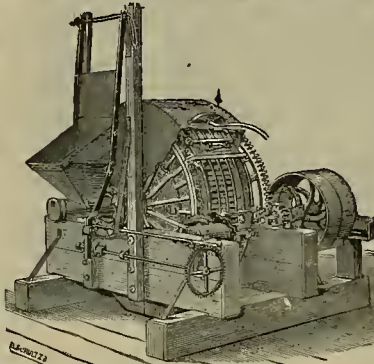
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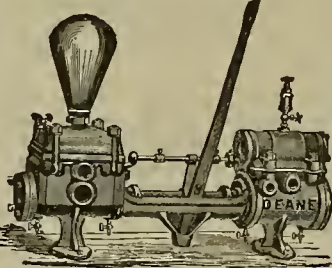
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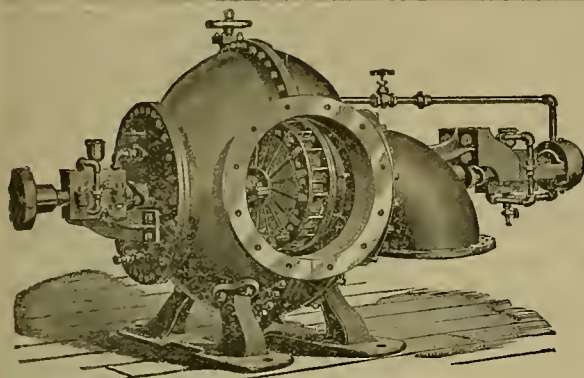
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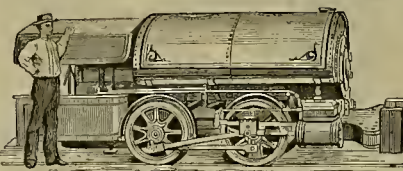
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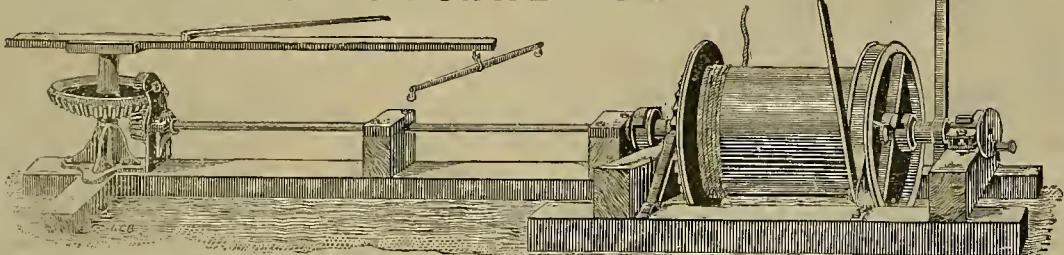


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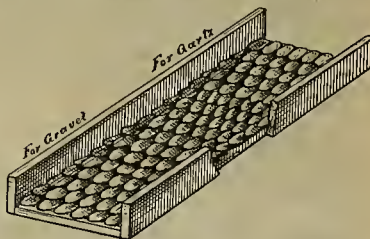
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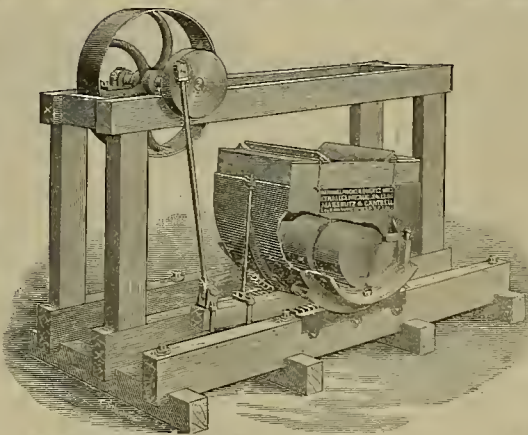
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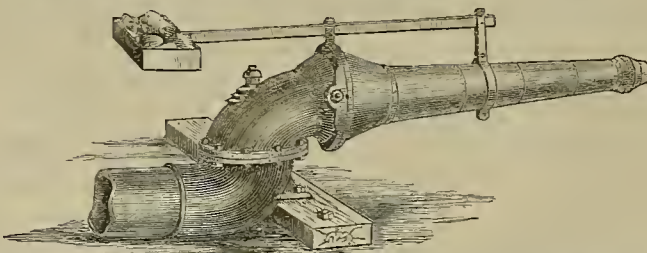
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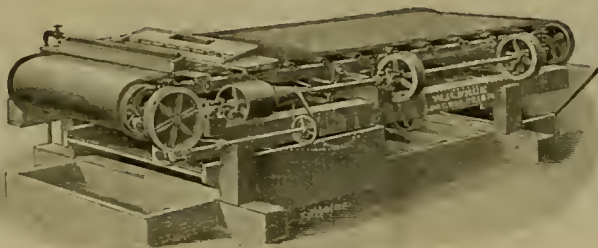
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The Best Ore Concentrator in the market, having double the Capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, ore being 350 tons per day, and is giving entire satisfaction as against 48 plain Belt Machines, taking the Pulp from the other 120 Stamps.

Price of Improved Belt Frue Vanner, \$825, f. o. b.
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Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

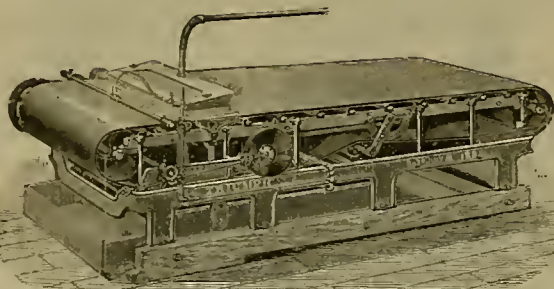
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
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We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin it need be. Circulars and testimonial letters furnished on application.



JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)

Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1886.
Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices.

[Signed] Sup't North Star and Original Empire Mining Co.
N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.



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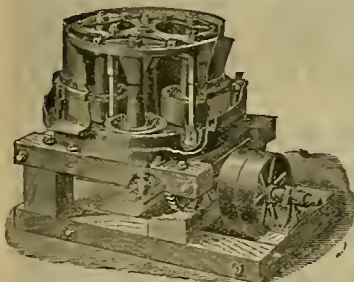
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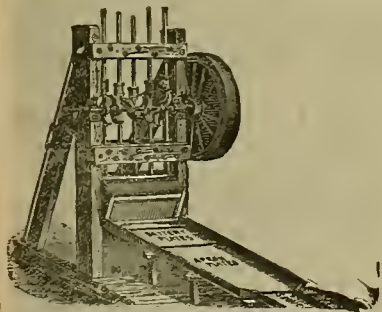
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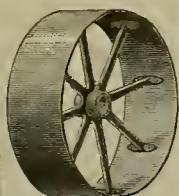
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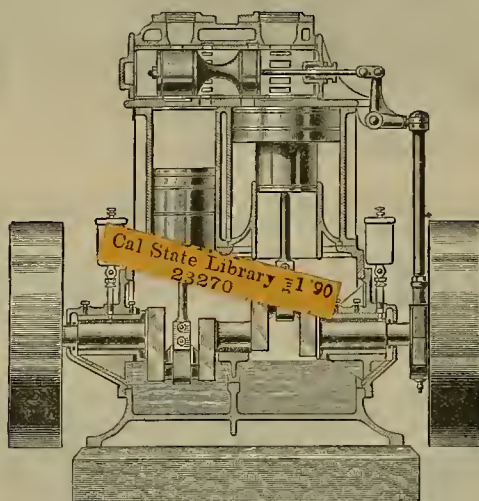
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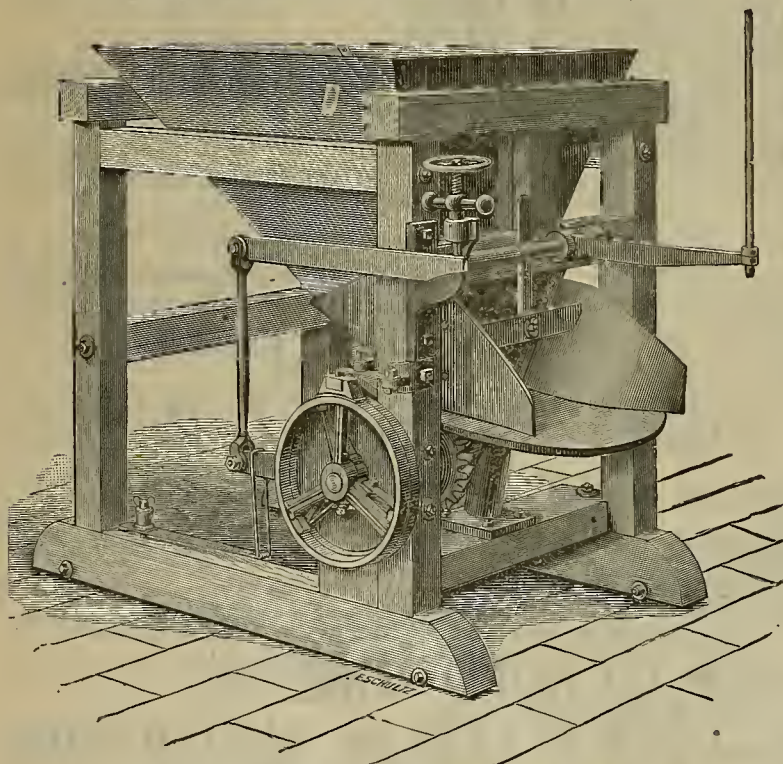
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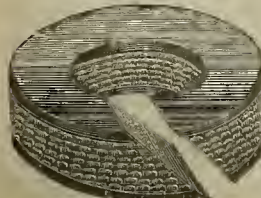
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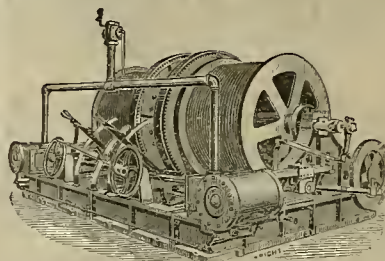
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MINING AND SCIENTIFIC PRESS

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXI.—Number 5.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, JANUARY 31, 1891.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

The Bear Valley Arch Dam.

In 1883 work was commenced on the Bear Valley arch dam, in San Bernardino county, and the reservoir formed by the completed structure was filled in April, 1886. The profile adopted is so thin that the dam cannot resist the thrust of the water by its weight, and it owes, therefore, its stability solely to the curved form of its base, which enables the wall to act as an arch. The dam was founded entirely on rock, and was built of granite laid in Portland cement mortar. Its plan is curved, the radius of the down-stream face being 300 feet. The length of the dam on top is about 450 feet. The front face of the wall is vertical and the back face battered.

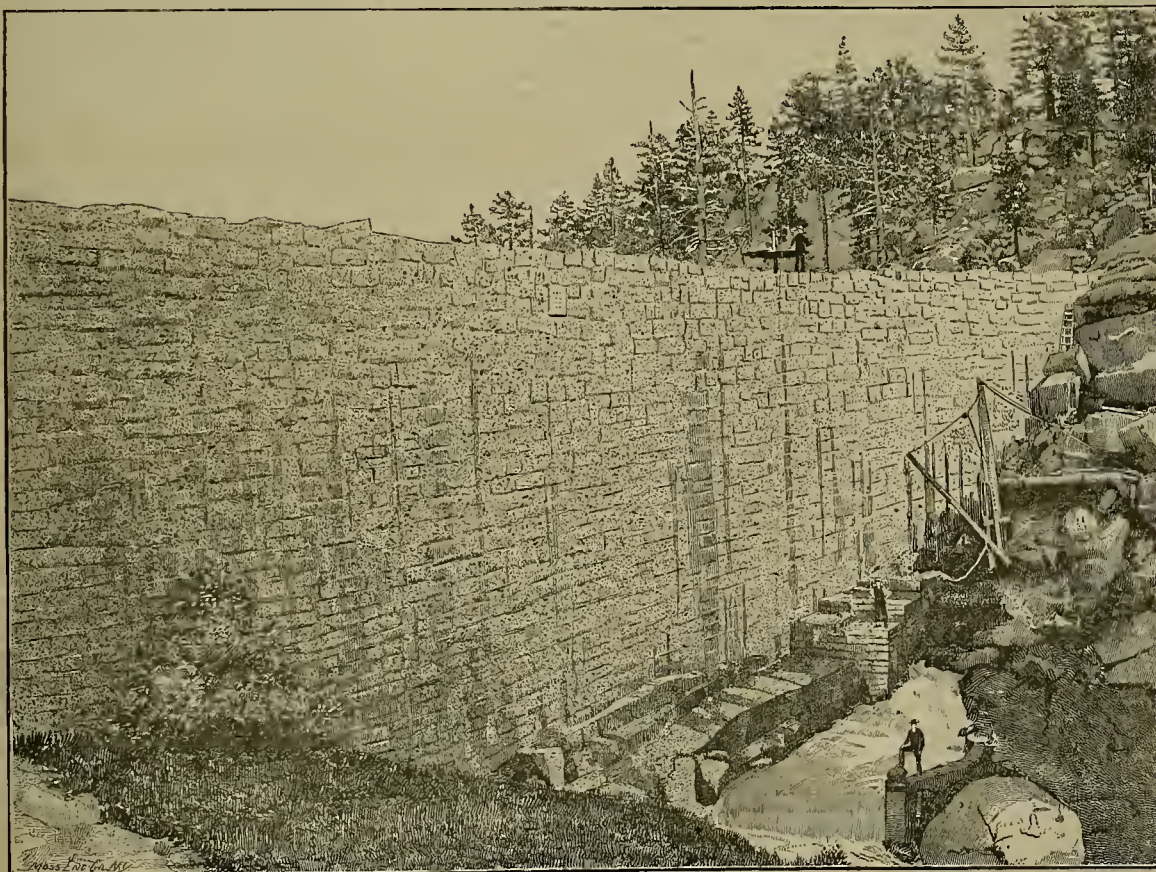
There is only one other dam of this character in the world, and that is the Zola dam, built to form a reservoir for supplying the city of Aix, France, with water. This dam is built of rubble masonry and circular in plan, the radius at the crown being 158 feet. This dam is unable to resist the thrust of water by its weight alone, and owes its stability solely to its acting as a horizontal arch abutting against the sides of the valley. The Zola dam was built in 1843 and is still standing.

The Bear valley arch dam was designed by Frank E. Brown, C. E., and has attracted great attention from engineers by reason of its peculiar shape and the lightness of construction. It was at first generally condemned as being too light for the purpose, but is now recognized as a piece of bold but successful engineering.

The granite from which the dam was built was quarried near by and roughly squared by a



THE BEAR VALLEY DAM FROM ABOVE.



THE BEAR VALLEY DAM FROM BELOW.

hammer. For the most part these blocks weigh less than one ton each, there being a few larger ones near the base. The blocks were laid in a bed of mortar composed of one-part Portland cement to three-parts of sharp sand. Their ends were placed from one to three inches apart, and the space was filled with broken stone and mortar thoroughly rammed.

The courses are very irregular, or rather there are no courses, the design being to have the works thoroughly bonded in all directions with no continuous seams.

There is but one outlet, which is located near the bottom of the dam, and it consists of an arched opening passing through and closed on the inside by a single cast-iron slide working in brass ways.

The waste weir is located at one side of the solid rock. For allaying the fears of the people in the valley below, a recommendation was made by Prof. Geo. Davidson of this city, to put the waste weir down at least ten feet below its original level, which was done.

The engravings given herewith (for the use of which we are indebted to Mr. L. M. Holt of the *Orange Bell*) show the general features of the Bear valley dam, with many of its details. Mr. J. S. Black, the assistant to Mr. Brown, writes thus concerning the strength of the dam:

"As there is no known instance in which a similar structure has ever been constructed, or even attempted, in which the strain approach to one-half this amount (referring to the 'strain-sheet' submitted by him), the question arises, Is the dam safe? To engineers this is an important question, apart from any consideration of damage that might result from a rupture, because of the effect an affirmative answer would have on all future practice in the

(Continued on Page 73.)

San Bernardino County.

Its Mineral and Other Resources.

NUMBER XXVII.

[Written for the PRESS by JAMES H. CROSEMAN.]

Death Valley and Surroundings.

The configuration of Death Valley resembles the letter "S." From Salt Springs on the south to Saratoga Springs on the north end of the valley, the distance is about 12 miles. From these springs it extends in a northwesterly direction for several miles, running thence northerly, finally taking a sweep around to the southward.

About a mile and a half northeast from the Salt Spring mines, sand-dunes have formed a complete barrier across the former confluence of the Mojave and Amargosa rivers. From the present mouth of the Amargosa river to the Amargosa horax-fields the distance is 16 miles. From the same point to McLean's ranch, the distance is 15 miles.

The river-bed proper on its southerly course consists mainly of beds of gypsum, nitrons earth, tufa-beds, sandstone and clay banks, all containing more or less soda, with an occasional deposit of gravel in the beds of water-courses.

From McLean's ranch through the canyon for a distance of 12 miles, about 100 inches (miners' measurement) of water flows on the surface, sinking finally into the desert sand. McLean's ranch is situated on the northerly slope of the hills surrounding the horax-fields.

From the summit of Cave Springs, 30 miles northwest of Garlic (see Article No. VII) to Saratoga Springs in Death Valley, the distance is 13 miles, with an average descent of 303 feet to the mile—a total of 3939 feet. Between Cave Springs and the mouth of Amargosa river, a distance of 18 miles, stretches a waste of sand which shifts about in the fitful gusts of wind or is driven before the blast of a heavy storm.

Saratoga Spring, in all probability, is the outlet of some subterranean channel or reservoir, as its waters are filled with fish—of what species, the Government expedition will have an opportunity of determining. This place is the resort of great numbers of ducks of several varieties.

The spring's basin is about 12 feet in diameter, nearly circular; its water flows upward with such force that a bather cannot sink deeper than his chin, though the feet find nothing more substantial to rest upon than bubbling quicksand. The water averages during the day 92° F. and is slightly alkaline. The spring overflows, forming a small running stream, in which grows a dense mass of tules, flags and aquatic plants. Horseflies, gnats and mosquitoes are abundant—a torment alike to man and beast. We are now in the vicinity of that portion of Uncle Sam's territory (Death Valley) about which so many sensational stories have been published that the Department of Agriculture of our Government has organized an expedition to explore these regions for the ostensible purpose of obtaining some knowledge of its flora and fauna. It is reported that the expedition will consist of two parties—one under Vernon Bailey and the other under Prof. T. S. Palmer. These parties start at opposite points, approaching each other and meeting eventually in Death Valley.

Every schoolboy in the country is aware that Death Valley is about the last place on earth that one would select as a suitable locality to carry on agricultural pursuits. It is to be hoped, however, that the knowledge gained by these learned gentlemen of the expedition will be of such a character as will prove beneficial to the commonwealth in a practical way.

The fauna of the valley is confined to but a few species, and to any but the bug-hunter is uninteresting and of but little value, consisting of an occasional jack-rabbit, rattlesnakes, horned toads, lizards, and insects all of well-known species; but this is not the class of fauna sought for to supply the table of the *bon vivant* or even that of the hungry prospector or pot-hunter.

The springs and other sources of water supply, however, are of vast importance to the desert traveler, and it should be a portion of the work of the expedition to build monuments at these important places and to erect guide-boards in order to properly direct the wandering traveler to these sources of the aqueous fluid, showing their direction and indicating the distance. It is all-important, too, that the geologist and mineralogist should accompany the botanist and naturalist, as it is possible there is no portion of the public domain of the United States where valuable mineral deposits occur in greater abundance or possess greater prospective value than the desert regions. Without these adjuncts the expedition will prove a failure and of no benefit. Painted pictures and colored maps are not what our people want. We want something practical and solid. Prof. Whitney published volumes on the geology of California, but forgot all about its mines and mineral resources. What this isolated section requires is fuel and water; with these two important adjuncts, the desert region would become one of the most productive mining sections in the United States. Water can be easily obtained by artesian wells from subterranean channels as well as from springs when properly developed.

The development of subterranean water is too

great an undertaking for individual capital, but is it not within the province of the General Government to do this very thing? Such a course will not only promote our mining industry but will reclaim what is now a barren unproductive desert. In that event it would be not only a profitable field for the miner but the agriculturist as well.

The mountain country around Death Valley lies in the form of a triangle.

The Funeral range, whose greatest elevation is 6754 feet, lies on the east with its lava-covered crest extending in an easterly direction for 10 miles and 30 miles westerly to the belted range with a width of 25 miles to the edge of Death Valley. The center of this massive outburst of molten rock is denoted by numerous low-angled coniferous vents bordering the valley on the west. The Panamint range, of which Telescope is the dominant peak, rising to an elevation of 11,047 feet, forms a striking feature and can be seen for long distances. On the northerly borders Chloride Cliff mountain rises boldly with its noticeable white capping; on the south the Black Butte, an isolated peak, is seen overshadowing this "Valley of Death." This butte, notwithstanding its forbidding appearance, contains several fine springs of pure water, 1½ miles distant from the edge of the valley. The valley varies from 8 to 15 miles in width and is 40 miles long. It lies within that area bounded by the meridian 116° 30', and 117° west longitude and parallel 35° 45' and 36° 30' north latitude. On the south branch, valleys extend southeastwardly and southwardly; the former known as the Amargosa valley, which has a length of 25 miles; the latter, Long valley, 12 miles long. It has been reported and is generally believed that a portion of Death Valley lies below the level of the sea, but this has never been authenticated by any actual survey, and it is a matter of considerable doubt which the new expedition will determine. The line of the greatest depression, however, lies on the eastern side of the valley, and extends northerly and southerly for 15 miles. The lowest depression is a little east of south from the mouth of Furnace creek. The formation surrounding the valley is composed of stratified sedimentary rocks, sandstones and fossiliferous limestone.

(To be Continued.)

The Free Coinage Bill.

The Free Coinage bill, which was passed by the Senate, is substantially as follows:

An Act to provide for the free coinage of gold and silver bullion and for other purposes. That from and after the date of the passage of this Act, the unit of value in the United States shall be a dollar, and the same may be coined of 412½ grains of standard silver or 25 S 10 grains of standard gold; and said coins shall be a legal tender for all debts, public and private; that hereafter any owner of silver or gold bullion may deposit the same at any Mint of the United States to be formed into standard dollars or bars for his benefit and without charge, but it shall be lawful to refuse any deposit of less value than \$100, or any bullion so base as to be unsuitable for the operations of the Mint.

SEC. 2. The provision of Section 3 of "An Act to authorize the coinage of a standard silver dollar, and to restore its legal-tender character," which became a law February 23, 1878, is hereby made applicable to the coinage in this Act provided for.

SEC. 3. That the certificates provided for in the second section of this Act shall be of denominations not less than \$1 nor more than \$100, and such certificates shall be redeemable in coin of standard value. A sufficient sum to carry out the provisions of this Act is hereby appropriated out of any money in the Treasury not otherwise appropriated. So much of an Act of July 14, 1890, entitled: "An Act directing the purchase of silver bullion and the issue of Treasury notes, and for other purposes," as requires the purchase of 4,500,000 ounces of silver bullion per month, be and the same is hereby repealed.

SEC. 4. The certificates provided for in this Act and all silver and gold certificates already issued shall be receivable for all taxes and dues to the United States of every description and shall be a legal tender for the payment of all debts, public and private.

SEC. 5. The owners of bullion deposited for coinage shall have the option to receive coin or its equivalent in certificates provided for in this Act, and such bullion shall be subsequently coined.

THE first silver dollars bearing the date of 1891 were coined Monday in the United States Branch Mint in this city, and 50,000 will be turned out every day hereafter until July next. The monthly output for January will be \$785,000.

A NEW mining district has been organized on the headwaters of Little Kern river, Tulare county, which is known as Soda Creek district. The ores are of low grade, but free milling. The country is well watered and timbered, and at an altitude of 9000 feet above sea level.

TRUSTEE W. R. ECKART of the Mechanics' Institute states that great interest is being manifested in the freehand and mechanical drawing classes, the former having at present 134 members enrolled and the latter 117.

Mining Corporations.

A Proposed Act for the Protection of Stockholders.

The following is Senate Bill No. 155, introduced by Mr. G. H. Campbell and referred to the Committee on Mines, Drainage, and Mining Debris:

An Act to amend an Act entitled "An Act amendatory of an Act entitled 'An Act for the better protection of the stockholders in corporations formed under the laws of the State of California, for the purpose of carrying on and conducting the business of mining,'" approved March 30, 1874, in effect April 23, 1880.

SECTION 1. It shall be the duty of the secretary of every corporation formed under the laws of the State for the purpose of mining, and the secretary of any other mining corporation doing business in this State, or of which its shares of capital stock are bought and sold in any stock exchange, to keep a complete set of books showing all receipts and expenditures of such corporations, the sources of such receipts, and the object of such expenditures, and also all transfers of stock.

All books and papers shall, at all times, during business hours, be opened to the inspection of any bona fide stockholder, and if any stockholder shall at any time so request, it shall be the duty of the secretary to attend at the office of said company at least one hour in the day, out of regular business hours, and exhibit such books and papers of the company as such stockholder may desire, who shall be entitled to be accompanied by an expert, and he shall also be entitled to make copies or extracts from any such books or papers. It shall be the duty of the directors, on the second Monday of each and every month, to cause to be made an itemized account or balance sheet for the previous month, embracing a full and complete statement of all disbursements and receipts, showing from what sources such receipts were derived, and for what and to whom such disbursements or payments were made, and for what object or purpose the same was made. Also, all indebtedness or liabilities incurred or existing at the time, and for what the same were incurred, and the balance of money, if any, on hand. And it shall be the duty of the directors to cause to be made a complete and accurate survey of the mine, together with maps or diagrams, showing such surveys; and such surveys shall be made just prior to each annual election, and the maps or diagrams shall accompany the annual report of the superintendent, and be posted in the office of the company for the inspection of all stockholders. Such account or balance sheet, survey, maps or diagrams, shall be verified under oath by the president and secretary, and posted in some conspicuous place in the office of the company. It shall be the duty of the superintendent, on the first Monday of each month, to file with the secretary an itemized account, verified under oath, showing all receipts and disbursements made by him for the previous month, and for what said disbursements were made. It shall also be the duty of the superintendent to file with the secretary a weekly statement, under oath, showing the number of men employed under him, and for what purpose, and the rate of wages paid to each one. He shall attach to such account a full and complete report, under oath, of the work done in said mine, the amount of ore extracted, the car sample assay value of the same, from what part of the mine taken, the amount sent to mill for reduction, the name of the mill, the amount of bullion received, its percentage of the car sample assay, the amount of bullion shipped to the office of the company or elsewhere, and the amount, if any, retained by the superintendent. It shall also be his duty to forward to the office of the company a full report, under oath, of all discoveries of ores or mineral-bearing quartz made in said mine, whether by boring, drifting, sinking, or otherwise, together with the assay value thereof and a copy of all surveys and maps or diagrams made of the workings in the mine since his last report. All accounts, reports, surveys, maps, or diagrams, and correspondence from the superintendent shall be posted in some conspicuous place in the office of said company and be open to the inspection of all stockholders. In case of the refusal or neglect of the superintendent to make and forward to the office of the company the accounts, reports, surveys, maps, or diagrams, provided for in this section, or in case he shall knowingly forward any false or incomplete account, report, survey, map, or diagram, he shall be guilty of a misdemeanor, and it shall be the duty of the directors of such corporation to remove, forthwith, the said superintendent, and thereafter he shall not be employed by any corporation existing under the laws of this State, and no salary shall be paid him, and any stockholder shall be entitled to recover, in any court of competent jurisdiction, against said superintendent the sum of one thousand dollars as liquidated damages.

SEC. 2. Any bona fide stockholder of a corporation formed under the laws of this State for the purpose of mining shall be entitled to visit, accompanied by his expert, and examine the mine or mines owned by such corporation and every part thereof, at any time he may see fit to make such visit and examination; and when such stockholder shall make application to the president of such corporation, he shall immediately cause the secretary thereof to issue and deliver to such applicant an order, under the seal of the corporation, directed to the superintendent, commanding him to show and exhibit such parts

of said mine or mines as the party named in said order may desire to visit and examine. It shall be the duty of the superintendent, on receiving such order, to furnish such stockholder every facility for making a full and complete inspection of said mine or mines, and of the workings therein; it shall be his duty also to accompany said stockholder, either in person or to furnish some person familiar with said mine or mines to accompany him in his visit to and through such mine or mines, and every part thereof. In case of the failure or refusal of the superintendent to obey such order, such stockholder shall be entitled to recover in any court of competent jurisdiction, against said corporation, the sum of one thousand dollars and traveling expenses to and from said mine as liquidated damages, together with costs of suit. In case of such refusal, it shall be the duty of the directors of such corporation forthwith to remove the officer so refusing, and thereafter he shall not be employed directly or indirectly by such corporation, and no salary shall be paid him. [Amendment, approved April 23, 1890; Amendments 1880, 135 (Ban. Ed. 400); took effect from passage; repealed conflicting Acts.]

SEC. 3. In case of the refusal or neglect of the president to cause to be issued by the secretary the order in the second (2d) section of this Act mentioned, such stockholder shall be entitled to recover against said president the sum of one thousand dollars and costs, as provided in the last section. In case of the failure or neglect of the directors to cause said surveys and maps or diagrams to be made, or to remove the superintendent as provided in section one, or to have the reports and accounts, surveys, maps or diagrams made and posted, as is provided in the first section of this Act, within ten days after the refusal or neglect of the superintendent, they shall be liable either severally or jointly to an action by any stockholder in any court of competent jurisdiction, complaining thereof for each and every such refusal, neglect or failure, and on proof of such refusal, neglect or failure, such complaining stockholder shall recover judgment for one thousand (\$1000) dollars liquidated damages, with the cost of suit, for each and every of such refusals, failures or neglects.

SEC. 4. Any bona fide stockholder of a corporation formed under the laws of this State for the purpose of mining may institute an action in his own name, or in the name of the corporation, to recover any and all moneys or property due to the corporation or to the stockholders thereof, and the judgment obtained therein shall inure to the benefit of the said corporation or its stockholders, as the case may be, subject to a lien on said judgment in favor of the plaintiff, for all sums of money expended by him for costs of suit and attorney's fees paid or agreed to be paid by plaintiff; provided, said money expended, costs of suit and attorney's fees do not exceed fifty per cent of the whole amount recovered.

SEC. 5. All Acts and parts of Acts in conflict with this Act are hereby repealed.

Silk in California.

The fifth annual report of the Ladies' Silk Culture Society of California has just been issued and is a document of very great local interest and importance, as it shows the accomplishment of many significant things. In the introductory portion of his report as president, Mr. W. B. Ewer points out clearly the amount of work which has been done with the limited funds entrusted to the board, and argues strongly against a disposition to underrate the accomplishment because, owing to the length of time required to establish a silk station and bring a mulberry grove up to the yield of large quantities of leaves, there have not been large results attained immediately. But Mr. Ewer proceeds to show, and in fact does show incidentally all through his argument, that there has been a vast amount of valuable work done, although the society has been constantly under the cloud of inefficient means to realize its plans and purposes. The items of this showing we have not space to set forth and must refer the student of the progress of silk-culture efforts to the perusal of the report itself. As it now stands, unless Congress shall take special action and restore the item for the Pacific Coast work to the appropriation bill, the Ladies' Society will be thrown again upon its own resources. The injustice of such refusal of Government aid is shown in this forcible paragraph in the report:

"The women of this, our Golden State, joined hands with their sisters in the East, and through wise management and slow but sure progress have demonstrated, beyond the possibility of a doubt, that the United States can produce silk of a quality not excelled by any other nation on the globe. The efforts on both sides of the continent have secured more or less aid from the Government. Their united efforts have reached results in ten years which took the Government of France fully one hundred years of time, and more than ten, probably twenty, times the amount of money that our own Government has expended. A careful and candid observation of the progress which has been made on this coast, we are fully persuaded, will not snuff in any way by comparison with what has been done at the East, even at a much larger expenditure, than has been appropriated for the work in California. All we ask is a slight advance on previous appropriations to carry out our work in full, as already outlined in this report. It is to be hoped that Congress will see the impropriety of with-

holding appropriations from the women of this State while continuing them to their sisters in the East."

The report of the secretary, Mrs. L. E. Pratt, is also a strong showing for the efficacy of the society's work. Incidentally there is given a little glimpse at the desk of the secretary, which shows that it has not been tenantless. We quote:

"Early in the season I was instructed to notify producers that the society would purchase cocoons at prices heretofore paid, receiving them unstuffed and remitting amounts due within 30 days thereafter. This stimulated correspondence, upward of 800 letters having been received and answered during the year, 25 counties being represented in the list of correspondents."

"I have personally superintended the weighing of all cocoons and report 600 pounds purchased, mostly in an unstuffed condition. The quantity would have been largely in excess of the previous year but for the lack of suitable buildings for increased work, and the disease so generally reported among worms from seed last distributed. I am pleased to note the generally improved quality as compared with those of previous years from the same locality. The amount disbursed for the purchase of cocoons appended below has been paid out in sums varying from 73 45-100 dollars to 25 cents."

But though these matters show work and progress, we find in the report of the Experimental Committee an achievement which seems to be beyond parallel and of great local significance.

"The experiment for 1890 was begun at the Piedmont station April 29th, and was made with the seed of the most select variety of silk worms, viz.: the *Frivulami* produced at the station the previous year under the careful supervision of Prof. J. J. Rivers. The hatching was most successful, fully 97 per cent completing the hatch by the fourth day, a result which we believe is without precedent. There being a sufficient supply of the *Mulicautis*, all were fed on this variety until the third molting, when they were separated into three divisions. First division, consisting of the best specimens of the first and second days hatch, were fed entirely on *Mulicautis*, until the time of spinning. The second division, composed of those a little less in size, were fed on the *M. Albi* and *M. Rosa* from the third molt to the time of spinning. The third division, comprising about 1400, the least in size of all, were placed in charge of a lady 81 years of age, and were fed on *M. Albi* alternating with *Nagasaki*, with the result that the second and third divisions made a most remarkable growth, and although a little later in spinning, their cocoons were so nearly the same as to size, weight, etc., of those first spun, as to be indistinguishable, if by accident they were exchanged."

"The result of the experiment fully establishes the superiority of the *M. Albi*, *M. Rosa* and *Nagasaki* for later feeding, and I doubt not if a portion of the most robust worms had been fed on these varieties from the third molting, those cocoons would have excelled the others, but want of room prevented the experiment."

"There were no signs of disease as viewed under the microscope or otherwise, there being less than 25 English worms in the whole brood, which were destroyed, each one of the remainder completing a cocoon within 35 days from the time of hatching."

"The result of the experiment proveth at superiority of acclimated seed over that of imported, in that about 97 per cent successfully hatched, whereas 80 per cent is a good average from imported seed."

"The silkworms from seed produced here were much more vigorous and healthy than those from imported seed; consequently, the loss sustained by disease was very slight, whereas a loss of 20 per cent must be counted on from imported seed."

This record shows that California silkworm eggs have an exceptionally high percentage of life and strength and are vastly superior to the imported. It seems to revive again the hope enjoyed a score of years ago that California might be the supply region of strong, healthy eggs for the silk producers of less favored regions. There is certainly found in the report of the society for the last year abundant evidence that its work should not only be continued but should be extended.

Notes from Calico.

A correspondent sends us the following notes from Calico, San Bernardino county:

"The 75 stamps of the Waterloo Mining Co. are running day and night on ore from the Waterloo and Silver King mines. About 200 tons per day of silver ore are sent through these mills. There is enough ore in sight in both mines to guarantee this output for some time to come."

"The Runover Co. are running their 20-stamp mill on ore from the Oriental No. 2, Red Cloud, Mammoth, Silver Monument and Occidental mines, and have all the ore they can treat."

"The Langtry mine, situated about 2½ miles northwest of the Waterloo mine, discovered by the McShane Bros., has been sold to the Barber Mining and Milling Co. Fifteen men are taking out ore and doing development work. This mine shows every prospect of being a heavy ore-producer in the near future."

"The Barber mill has been closed down for repairs for the past three weeks, but will drop the stamps again in about a week."

Mineral Lands.

Proposed Change in Existing Laws

The House Committee on Mines and Mining has reported to the House, with amendments, the Senate bill which passed the Senate, Dec. 18, 1890, and was submitted to the House next day. It has been in the hands of the committee since that time. The following is the full text of the bill as it passed the Senate:

SECTION 1. That section twenty-three hundred and twenty-four of the Revised Statutes be amended so as to read:

"SEC. 2324. The miners of each mining district may make regulations, not in conflict with the laws of the United States or with the laws of the State or Territory in which the district is situated, governing the location, manner of recording amount of work necessary to hold possession of a mining claim, subject to the following requirements: The location must be distinctly marked on the ground by posts or monuments, so that its boundaries can be readily traced. All records of mining claims hereafter made shall contain the name or names of the locators, the date of the location, and such a description of the claim or claims located as will identify the claim. On each lode claim located after the tenth day of May, eighteen hundred and seventy-two, and until payment of the purchase money and a certificate of entry has been issued therefor, not less than one hundred dollars' worth of labor shall be performed or improvements made during each year. On all lode claims located prior to the tenth day of May, eighteen hundred and seventy-two, ten dollars' worth of labor shall be performed or improvements made during each year for each one hundred feet in length along the vein until payment of the purchase money and a certificate of entry has been issued therefor; and for each twenty acres of placer claims, and for each subdivision thereof less than twenty acres, ten dollars' worth of labor shall be performed or improvements made during each year until payment of the purchase money and a certificate of entry shall be issued therefor. But where several adjoining lode claims, not exceeding five, are owned or held by the same person, association, or corporation, and the sum of five hundred dollars or more is expended in any one year in good faith for the development of all of the claims so owned or held, not exceeding five, there shall be no requirement for separate labor or improvements to be performed or made on the several claims so owned or held during such year. The year within which the annual labor or improvements required to be performed or made by this section shall commence at twelve o'clock meridian on the first day of October of each year: *Provided*, That upon claims located previous to the first day of March in any year, the annual labor or improvements shall be performed or made on such claim for that year prior to twelve o'clock meridian of the first day of October next succeeding; and upon claims located after the last day of February and prior to twelve o'clock meridian of the first day of October in any year the annual labor or improvements required shall be performed or made within one year from twelve o'clock meridian of the first day of the succeeding October: *And provided further*, That only one-half of the annual labor or improvements required by this Act shall be necessary to be performed or made prior to twelve o'clock meridian of the first day of October, in the year eighteen hundred and ninety-one, on claims upon which the annual labor or improvements were performed or made in the year eighteen hundred and ninety; but after the first day of October, in the year eighteen hundred and ninety-one, the full amount of labor or improvements required by this Act shall be performed or made upon such claims as in all other cases during each year prior to twelve o'clock meridian of the first day of October. In case the first day of October falls on Sunday or any holiday, the following secular day shall be construed as the first day of October within the meaning of this Act. When the labor required by this Act shall have been performed or the improvements made, an affidavit may be filed within thirty days after the time limited for performing such labor or making such improvements with the recorder of deeds of the county in which the claim or mine is situated, particularly describing the labor performed and improvements made, and the value thereof, which affidavit shall be prima facie evidence of the facts therein stated. And upon a failure to comply with the conditions of this Act in the performance of labor or making of improvements, the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made: *Provided*, That the original locators, their heirs, assigns or legal representatives do not resume work upon the claim after such failure and before such relocation, and continue the same with reasonable diligence until the required amount of labor shall have been performed or improvements made; but no relocation of a claim by a person who has already located such claim and failed to comply with the conditions of this Act in performing work or making improvements shall be valid prior to such resumption and continuance of work upon such claim. Upon the failure of any one of several co-owners to contribute his proportion of the expenditures required hereby, the co-owners who have performed the labor or made

the improvement may, at the expiration of the year, give such delinquent co-owner personal notice in writing, or notice by publication in the newspaper published nearest the claim, for at least once a week for ninety days, and if at the expiration of ninety days after such notice in writing, or by publication, such delinquent shall fail or refuse to contribute his proportion of the expenditure required by this section, his interest in the claim shall become the property of his co-owners who have made the required expenditures. A copy of such notice, together with an affidavit showing personal service or publication, as the case may be, of such notice, when filed and recorded with the recorder of deeds of the county in which such mining claim is situated, shall be evidence of the acquisition of title of such co-owners. Where a person or company has or may run a tunnel for the purpose and with the intent in good faith of developing a lode or lodes owned by said person or company, the money so expended in running said tunnel shall be taken and considered as expended on said lode or lodes: *Provided further*, that said lode claim or claims shall be distinctly marked on the surface as provided in this Act."

SEC. 2. That section twenty-three hundred and twenty-five of the Revised Statutes be so amended as to read:

"SEC. 2325. A patent for any land claimed and located for valuable deposits may be obtained in the following manner: Any person, association, or corporation authorized to locate a claim under this chapter, having claimed and located a piece of land for such purposes, who has, or have, complied with the terms of this chapter, may file in the proper land office an application for a patent, under oath, showing such compliance, together with a plat and field notes of the claim or claims in common, made by or under the direction of the United States Surveyor-General, showing accurately the boundaries of the claim or claims, which shall be distinctly marked by monuments on the ground, and shall post a copy of such plat, together with a notice of such application for a patent, in a conspicuous place on the land embraced in such plat previous to the filing of the application for a patent, and shall file an affidavit of at least one person that such plat and notices have been duly posted, and shall also file a copy of the notice in such land office, and shall thereupon be entitled to a patent for the land in the manner following: The register of the land office, upon the filing of such application, plat, field notes, notices and affidavits, shall publish a notice that such application has been made, for the period of sixty days, in a newspaper to be by him designated as published nearest to such claim; and he shall also post such notice in his office for the same period. The claimant at the time of filing this application, or at any time thereafter within the sixty days of publication, shall file with the register a certificate of the United States Surveyor-General that five hundred dollars' worth of labor has been expended or improvements made upon the claim by himself or grantors; that the plat is correct, with such further description by such reference to natural objects or permanent monuments as shall identify the claim, and furnish an accurate description, to be incorporated in the patent. At the expiration of the sixty days of publication the claimant shall file his affidavit, showing that the plat and notice have been posted in a conspicuous place on the claim during such period of publication. If no adverse claim shall have been filed with the register and receiver of the proper land office at the expiration of the sixty days' publication it shall be assumed that the applicant is entitled to a patent, and that no adverse claim exists, and upon the payment to the proper officer of five dollars per acre he shall receive a certificate of entry; and thereafter no objection from third parties to the issuance of a patent shall be heard except if he shown that the applicant has failed to comply with the terms of this chapter. But no more than three thousand feet in length along the vein or claims located prior to the tenth day of May, eighteen hundred and seventy-two, and not more than the extent of fifteen hundred feet in length by six hundred feet in width located after said date, shall be included in the same application for a patent, and not more than forty acres of placer ground shall be included in the same application for a patent: *Provided*, That when fractional claims are located or sought to be patented between other existing claims the end lines may be made to conform to the lines of such adjoining claims."

SEC. 3. That section twenty-three hundred and thirty-four of the Revised Statutes be amended by adding thereto the following:

"And the surveyors appointed under the provisions of this section shall have power to administer oaths to their assistants."

SEC. 4. That section twenty-three hundred and thirty-five of the Revised Statutes be amended so as to read:

"SEC. 2335. All affidavits required to be made under this chapter may be verified before any officer authorized to administer oaths in any State or Territory of the United States or in the District of Columbia having an official seal, and all testimony and proofs may be taken before any such officer, and when duly certified by the officer taking the same, attested by his seal of office, shall have the same force and effect as if taken before the register and receiver of the land office. In cases of contest as to the mineral or agricultural character of land the testimony and proofs may be taken, under such regulations and notice as the Commissioner of

the General Land Office may prescribe: *Provided*, That the presence of rock in place bearing gold, silver, cinnabar, or other valuable metal, shall be regarded as prima facie evidence that the land containing the same is mineral in character."

SEC. 5. That section twenty-three hundred and thirty-seven of the Revised Statutes be amended so as to read:

"SEC. 2337. Where non-mineral land not included in a lode claim is used or occupied, or is intended in good faith to be used or occupied by the proprietor of such vein or lode claim for mining or milling purposes, such non-mineral surface ground may be embraced and included in an application for a patent for such vein or lode claim, and the same may be patented therewith or separately, subject to the same preliminary requirements as to survey and notice as are applicable to vein or lode claims; but no location hereafter made of such non-mineral land shall exceed ten acres, and payment for the same must be made at the same rate as fixed by this chapter for the superficies of the lode claim. The owner of a quartz-mill or reduction works, not owning a mine in connection therewith, may also receive a patent for his mill-site as provided in this section."

SEC. 6. Amend section twenty-three hundred and thirty-eight of the Revised Statutes so as to read:

"SEC. 2338. As a condition of sale each patent shall reserve the right of way through or over any mining claims for roads, ditches, canals, cuts, tunnels, and other easements, for the purpose of working other mines: *Provided*, That any damages occasioned thereby shall be assessed and paid in the manner provided by the laws of the State or Territory in which such mine is situated for assessments and payments for land taken for public use under the right of eminent domain. And the rights and easements heretofore reserved under the provisions of this section (twenty-three hundred and thirty-eight of the Revised Statutes) in patents heretofore issued shall be regulated and made available as herein prescribed."

SEC. 7. That town-site entries may be made by incorporated towns and cities on the mineral lands of the United States, but no title shall be acquired by such towns or cities to any vein of gold, silver, cinnabar, copper, or lead, or to any valid mining claim or possession held under existing law. When mineral veins are possessed within the limits of an incorporated town or city, and such possession is recognized by local authority or by the laws of the United States, the title to town lots shall be subject to such recognized possession and the necessary use thereof, and when entry has been made or patent issued for such town sites to such incorporated town or city, the possessor of such mineral vein may enter and receive patent for such mineral vein and surface ground recognized by the local laws and statutes of the United States not held or possessed adversely to the claimant for such mineral vein by other than the said city or town, or when it shall appear that the claimant otherwise entitled to such mineral vein has acquired title to such surface ground from the said city or town: *Provided*, That no entry shall be made by such mineral-vein claimant for surface ground where the owner or occupier of the surface ground shall have had possession of the same before the inception of the title of the mineral-vein applicant."

Fresno Coal.

The Fresno *Expositor* thus describes the coal mines in the county: The mines are near Coalinga, on the Hanford branch of the Southern Pacific railroad, and in the foothills of the Coast Range in the western portion of the county. In a direct line they are about forty miles from the city of Fresno, by rail about eighty-nine miles. Up to the present only two companies have engaged in the work of mining the coal, namely, the San Joaquin Valley Coal Company and the California Coal Mining Company. The latter has only made a beginning, while the former's operations are on quite an extensive scale. The coal is a lignite or highly bituminous shale of the same general character as all coals hitherto found on the Pacific Coast. There are three varieties of coal in the vein, the upper and lower parts resembling cannel coal and the middle more like lignite. This coal approaches in analysis Coos Bay coal more than any other. There is enough coal in this county's coal region to last for centuries. The vein is four feet thick and the outcroppings can be traced for many miles north and south. The stratum is well defined and has been found perfectly regular so far, which makes it easier to work it and therefore cheaper. The layer has a slope of 27° and is mined overhead, a "lift" being 125 feet. The mines are worked by tunnels run into the sides of the hill, and are conducted by San Francisco and Fresno capitalists.

J. G. MENOAL, engineer in chief of the Nicaragua Canal Co., writes to a friend in this city that on Jan. 3d they had 15 feet of water at Greytown, and at the present rate of working would have 21 feet in 60 days. The dredger is at work and the mole being extended.

MESSRS. SCOTT, ECKART AND FIRTH have been appointed a committee of the Mechanics' Institute to acknowledge to A. S. Halliday the great benefits derived from his inventions of cable-car appliances.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CARRARA MARBLE CO.—Ledger, Jan. 24: A party of capitalists, accompanied by an expert in marble, paid a visit to the quarry located on Sutter creek, four or five miles below Volcano. They were very much pleased with the quarry, both as regards the extent and quality of the deposit. The company has not been fully organized yet. It is expected that everything will be arranged so as to commence active operations as soon as spring opens.

MISCELLANEOUS.—George Thomas has been working for some time on the White quartz mine, between Jackson and the Gate. A winze has been sunk alongside the ledge to the depth of 80 feet. Quartz of good quality is reported to have been taken out of the bottom. Ten stamps of the mill of the Amador gold mine were started on ore from the Hardenburgh mine at Middle Bar this week. It is the intention to make a thorough test of the quality of the ore, and the result will no doubt largely govern the future operations at this mine. The Kennedy is probably the best gold-producer of Amador county at the present time. The net yield last month is said to be in the neighborhood of \$20,000.

SUTTER CREEK.—Cor. Amador Ledger, Jan. 24: Once more the developments in the North Star have raised the hopes of the stockholders. Gouge has been encountered, which, in itself, is an excellent indication. Not only this, but within the last day or two a vein of quartz has been struck which is very rich, free gold being plainly visible. It is hoped that this will lead to a permanent ore body. It is confidently expected that the Mahoney will start up before long. Fifty tons of iron is on its way, for making several thousand feet of pipe to connect the mill with the Amador canal. Some of the iron has already arrived. It is rumored that the mill will be started as soon as the connection is made, perhaps for a time on surface rock. It is hoped that as soon as the mine can be opened the rock for the mill will come from the lower levels, and that the Mahoney will take its place as one of the permanent mines of the county.

PLYMOUTH.—W. T. Jones has bonded the Bay State mine from Hayward, Hobart and Poundstone. The location of the mine is north of Plymouth, and near Enterprise. It was known some years ago as the McGuire mine. There is a fine ledge of low-grade ore, that has paid on an average \$3.50 per ton with the commonest kind of an old-fashioned quartz mill, no sulphurets being saved; but with the latest improved machinery would go much higher, and the sulphurets are known to be very rich and easy to work. The mine is sunk at present less than 500 feet deep, and the ore is so abundant that it can be mined and milled at a cost of \$2 per ton. The New London mill is shut down, and there is no time stated when it will start up again. The mine is still working with enough men to keep the water out and prospected. The Pacific is running along with a small crew of men prospecting for a big thing. The Good Hope is getting out pay ore and sacking it up preparatory to moving to the mill.

Calaveras.

THE TUTTLE MINE.—Calaveras Chronicle, Jan. 24: Last Saturday we visited the Tuttle gravel mine in Chili gulch, about three miles from this place, where prospecting operations have been going on for the past six or eight months under the direction and superintendency of Geo. R. Tuttle, a gentleman of large mining experience. In striking contrast to most mining ventures, we found no big developments on top. There is a modest water-power hoist run by a six-foot Donnelly wheel, against which the water plays under a 200-foot pressure. A fine working shaft, framed with sawed timber and lined with two-inch plank, 200 feet in depth, 34½ feet in the clear, with a ladder-way 23½ feet, has been sunk. This shaft will drain thoroughly the northern portion of the channel. Drifts have been run east and west, the explorations in the former extending 250 feet without reaching the rim rock, and the latter over 40 feet, reaching what may prove to be the rim, but which, there is reason to believe, is only a little swell in the ledge to be followed by a depression, hence not yet showing the western boundary of the channel. Should it be revealed that the rise encountered is the western limit of the channel, the gravel deposit would then show a breadth of about 300 feet. The mine comprises about a quarter of a mile of new ground on the channel to the north line, with 3500 feet of untouched ground to the southern boundary. The drifts are in gravel from top to bottom, the depth of the deposit being known to be more than 12 feet in some places and prospecting well throughout and will run from \$2 to \$5 a carload. With this showing a mill is to be put up as soon as the material can be laid upon the ground, the grading for which has already been completed.

LEHIGH GRAVEL.—Calaveras Prospect, Jan. 24: Henry C. Richards, President of the Lehigh Gravel mine, and V. E. Frost, the Superintendent, have been in Murphy's the past week looking after the extensive interests of the company. The Echo mine, as it is generally called, has had many ups and downs. The Lehigh Gravel M. Co. leased the ground some time ago, and under the superintendence of Mr. Wilson, made extensive explorations, and did what no parties have done heretofore, succeeded in reaching the water, which is pretty good evidence that the old Table mountain channel has been struck. Mr. Frost has recently been appointed superintendent, and we learn that he intends to prosecute the work with vigor. This ought to be a good mine and we have the firmest faith that it will so prove eventually. About 1875 it was held in the London market at \$1,000,000, and we should not be surprised to see it bring that amount in the near future. Vernon Wilson and Dave McDonald are at work opening their mine opposite the tollgate at Murphy's. They are working four men at present, and have erected quite substantial hoisting works. This mine was worked several years ago on a small scale and paid well, but lack of money for the proper development caused its abandonment. The Lone Star mine at West Point paid off last week and is preparing to start in with renewed vigor to work that extensive property. The Blazing Star in the same district has started up again. Everything points to a lively season at the Point this spring

J. H. Sterling is doing some extensive prospecting about West Point. The Central Hill mine between Murphy's and Douglas Flat is rushing now under Mr. Buckminster's energetic management. The Norfolk at Murphy's is running both mill and mine, full handed.

SALTWARE.—Mountain Echo, Jan. 22: The Saltware mine, situated on Indian Creek, this county, has been bonded to a San Francisco company and it is said that a 20-stamp mill is soon to be erected.

THE DAUPHIN MINE.—Calaveras Chronicle, Jan. 24: The Dauphin mine, located above Jesus Maria, is likely to prove a good investment. The mine has been prospected off and on since 1851, and a nice little "pocket" was struck by Chilenos, who worked it in early days, from which they extracted the snug little sum of something like \$45,000 in a very short time; and at various periods since, good yields have been obtained. Recently, good rock has been encountered in the prosecution of prospecting operations, and in the event of a continuance of these very favorable developments a mill will be put up at once. Mr. William Caldwell of San Francisco is now the sole owner of this property, and he feels highly elated over the developments. The mill plant is secured and ready to be shipped as soon as a few weeks more prospecting will have been done and the results warrant the construction.

El Dorado.

A BIG PROPERTY.—Georgetown Gazette, Jan. 22: The lode is porphyritic-talc formation, known to extend for more than 4000 feet from the town to the north, on which sluicing has been done at various points at intervals since the '50's. The lode has an average width of 20 feet. A shaft was sunk on west side, and after extending crosscut 32 feet a granite-like foot-wall was cut when rich prospects were found, and the ore has continued to increase in gold up to the present face of the cut, which shows 19 feet of lode, and not yet cut through. The entire 19 feet will mill at least \$20 to the ton. It looks as if the last three feet penetrated would mill \$100 per ton. The lode is cut at a point 80 feet below the surface. A Huntington mill is reducing ore at the rate of 18 tons in 24 hours, and judging from the amount of amalgam that accumulates at the point of discharge (the mill retains most of the gold) a rich clean-up will be made. Not a particle of free gold or quick passes beyond the silver plates, and Mr. Hersey, the amalgamator, takes pride in inviting expert panners to detect the same. Supt. Tischer has seen many good-paying mines but this beats them all, as every evidence (the lode at this point being "uncovered" for a distance of 500 feet) shows permanency of rich milling ore. The management will soon decide upon a system of extensive works. The present is merely a prospecting outfit.

Inyo.

ANTIMONY.—Register, Jan. 22: In doing the assessment work on the antimony mine owned by Wm. Hannigan, at Wild Rose, an immense body of fine ore was recently uncovered. The Austin antimony miners are said to think a 60-pound chunk of rich metal pretty large. Mr. Hannigan says he has in sight regular holdwires of it of 200 or 300 pounds weight.

STRIKES.—Inyo Index, Jan. 24: Glowing reports of rich strikes in the White Hill district of the Inyo mountains are coming in. There is enough silver-lead in that section to enrich thousands.

Nevada.

THE BRUNSWICK MINE.—Transcript, Jan. 24: Assessment No. 1 of two cents a share has been levied by the Brunswick M. Co. of New York, whose quartz claim is located at Grass Valley. A circular just issued by the vice-president explains the necessity for the assessment. The development thus far has been so satisfactory that an assessment was deemed wise to provide funds for pushing the work further so that sufficient accumulation of ore could be obtained to keep the mill running after it has been started.

A GOOD MOVE.—Nevada Co. Herald, Jan. 24: Efforts are being made to induce the South Yuba Canal Co. to bring water down the Washington ridge. The representatives of the company will examine the route and soon decide whether the work will be done or not. Should the water be brought down that way it would encourage the opening of mines all along the line from the Sugar Loaf to the Central House. It would afford facilities, also, for irrigating and would probably result in the development of a great deal of agricultural land.

RICH QUARTZ.—Grass Valley Union, Jan. 27: Several very rich specimens of quartz were exhibited at Weissstein Bros.' bank yesterday, that came from the Irish-American claim on New York Hill. The gold was heavy and showed in hard quartz, which also made a good showing of galena. The quartz was taken out by tributaries, who are now working the ground. The Irish-American lies due north of the North Star mine (the Fahey claim intervening) and adjoins the New Rocky Bar mine on the west. It is on the rich quartz belt on the west side of Wolf creek, which has produced millions of dollars.

STRUCK A BIG LEDGE.—Nevada Transcript, Jan. 20: Leonard & Son have found a four-foot ledge of gold-bearing ore on the hill half a mile above Jones Bar on the South Yuba river. Several years ago a quantity of wonderfully rich float quartz was picked up in that vicinity, pieces of it being worth at the rate of \$20,000 a ton, and various parties have since been engaged at intervals in hunting for the ledge the float came from. The Leonards think they now have it. The course of the ledge appears to be such that it crosses the river and through the territory near the head of the G. V. R. and T. Co. tunnel.

Placer.

ROCK CREEK.—Placer Herald, Jan. 24: Pike Bell is running his mill night and day at present, crushing rock taken from his mine on the Beecher place on Bald hill. W. S. Graham, M. T. Lawrence and Bell will soon commence building a reservoir on the Green Emigrant hill. The reservoir is meant to hold water for sluicing the rich surface dirt from the hill, and these gentlemen expect big returns for their outlay.

Santa Cruz.

PETROLEUM MINES.—Santa Cruz Sentinel, Jan. 24: The mining at the petroleum mines in the hills nine miles north of this city and three miles from the sea, is abating in its product. These mines are three in number, the Walrath, Cowell and Consolidated Bitumen. They are near together, but some distance apart via the roundabout roads by which

they are connected. It is estimated that their present output is from 80 to 100 tons per day, and that 15 men in the mines and 30 men and 30 teams on the road are employed, at an expense of \$70,000 per annum. A *Sentinel* representative visited the mines and found mean roads to start with and roads in a mean condition, muddy, narrow, rough and steep. In some places the bitumen is on the surface of the ground, in other places under the ground, in others under rock, in others on top of the rock; thin, thick, and in some instances oozing out in a liquid form. The face indications of the mines named lead to the conclusion that the bitumen deposits of this county are inexhaustible, and that so long as they can be worked successfully they will be a source of great revenue to this city and its immediate vicinage. As these mines must be worked in competition with San Luis Obispo and other deposits, owned by men of push and twenty-dollar pieces, we must have shorter roads, roads of lighter grades, roads of solid bottoms in wet weather, and cheaper shipping facilities generally. This is a business proposition, brought to our doors by sharp competition.

San Diego.

OWENS.—Julian Sentinel, Jan. 23: The new boiler for the Owens mines is being put in place this week. The work of bailing out the mine is progressing favorably, and it is thought in another week the pump will be reached, when all will be smooth sailing.

STRIKE.—A rich strike has been made in a Banner mine the past week. We are not at liberty to give names or particulars at present, but it is an important find and we will be glad to give further notice as soon as we receive permission from interested parties.

Shaeta.

THE EUREKA TELLURIUM MINE.—Democrat, Jan. 23: In company with Peter Scherer, treasurer of the Eureka Tellurium M. Co. and superintendent of the company's mine on Salt creek, we went out to see this mine yesterday forenoon. We found development work under full headway. The company is now driving a large working tunnel with a Phoenix drill. The working plant consists of a fine air-compressor engine of 30-horse power, which drives the drill and ventilates the tunnel. The power plant is located at the mouth of the tunnel, and the boiler and engine are set on a concrete foundation; the floor of the engine-room is all concrete. Everything about the plant is neat, bright and clean. Going into the tunnel, we saw the drill work. Monday, one shaft put in seven four-foot holes and the blasts used up 15 pounds of powder. From this, miners will understand that the company is making rapid headway with the tunnel. The rock through which the tunnel is driven is exceedingly hard serpentine, consequently no timbers are required. The tunnel is now in 280 feet, and according to the survey, in 370 feet more the ore body will be encountered quite a depth under the development shaft on the hill. Recent developments in the shaft and everything about this mining enterprise give assurance that the tunnel will open a very rich mine.

SILVER AND GOLD.—Floyd Vickers returned from Igo last Monday and brought with him samples of antimonial silver and gold ore recently encountered in the old Dayton mine. In doing the assessment work, driving ahead on the prospect tunnel, this new body of ore was struck. The vein is about three feet wide and the ore will assay an average of about \$350 a ton. The owners are greatly elated over this strike and feel confident they will speedily develop a big mine, and calculate soon to commence shipping ore to a smelter.

COAL.—Newt. Welsh of Millville was in town yesterday, and informed us that a couple of Pennsylvania coal-miners, backed by a San Francisco capitalist, are prospecting a coal vein on Coal gulch, about 12 miles east of Millville. They have sunk a shaft about 80 feet on the ground. They say the shaft has passed through a vein of very good steam coal, and are well satisfied with the prospects of opening a good coal mine. Mr. Reed, mining engineer and superintendent of development work on the Central mine in Old Diggins district, is running a new and lower tunnel on that mine. The tunnel is now about 80 feet.

NEW QUARTZ MILL.—Democrat, Jan. 23: In company with Fred Grotefeld, we went out to Old Diggins mining camp last Sunday to see the new ten-stamp quartz mill that is almost completed by Mr. Hart, owner of the Texas and Georgia mine. The mill is erected on the river bank about a mile north of the Walker Bros.' mill. Its present capacity is ten stamps, so arranged that ten additional stamps can be put in at any time, and this Mr. Hart intends to do some time next summer. The machinery is run by a 65-horse power engine planted on the east side of the building, and the water is pumped from the river to a tank holding 7500 gallons, situated on the hill above the mill. Sitting in line with the battery are four improved Frue concentrators. Above the stamps is an ore bin that will hold 400 tons of ore, and above the bin is stationed a large Dodge rock-crusher, which is run by a small engine, but fed with steam from the main boiler. But to us the most interesting feature about this mining enterprise is the huckle cable ore tramway that was just being finished while we were there. The tramway is calculated to deliver five tons of ore an hour. It is a little less than a mile in length, or nearly two miles of cable. The station at the mine is about 625 feet higher in altitude than at the mill. The engine at the mill runs the whole plant. This is the first cable tramway ever erected in this part of the State, and taking it altogether is the most complete and modern milling plant in this part of the State. The tramway was finished last Sunday, and in a very few days the mill will be finished and the whole plant running.

Siskiyou.

BLUE GRAVEL.—Yreka Journal, Jan. 21: Geo. W. Henderson, a mining expert from below, was in this county last week and made a thorough examination of the blue gravel mines at Cottonwood creek, also on Greenhorn creek and around Yreka, and considers them rich, paying mines, such as cannot fail to create a big mining boom for Siskiyou in the near future. He firmly believes the blue gravel deposit, so extensively found in all our mining districts, is much deeper in some of them than in others. Lee, Lash & Co. are still cutting a tunnel into their blue gravel claim at Greenhorn, and find the bedrock pitching under a hill, requiring deeper drainage in order to take out the rich pay gravel, which seems to

be in the bed of an ancient river or lake. As soon as good drainage can be secured to the pump shaft, to permit working, they intend putting on a large force of men, and expect to realize an extensive haul of gold-dust, as all the blue gravel so far tested has paid exceedingly rich.

HORN BROOK.—Clear frosty weather for the past week, but not very cold, just ice enough to prevent miners turning water in the ditches. Jilison & Co. had five days and nights piping and had to clean up in order to extend the race and flume. They were not half through cleaning up when they were compelled to turn the water out of the ditch. Just the same they realized \$350 from the five days work, picking up \$100 in coarse pieces on the bedrock. This is undoubtedly one of the best mines in the county, and next summer's cleanup will make advocates to blue gravel and cause still more capital to be invested in this end of the county. The Black Jack continues to prospect well, the best prospect ever found in the mine being found a few days ago in their main tunnel. The mine will probably be worked on an extensive scale the coming summer. Gilham and Paine have a contract to sink a shaft on the Portland Co.'s property, and are down 25 feet. Conant and Fowler, who have a bond on the Amous & Co. quartz property, are driving the main tunnel, and the property, from present indications, is a good one, the ledge being three feet, with \$15 to \$20 in free gold and plenty of rich galena sulphurets.

Sierra.

GOLD DUST.—Mountain Messenger, Jan. 24: Hayes & Steelman cleaned up their flumes at Gold Lake last week and as a result carried \$35,000 worth of gold dust to San Francisco. A section of the Thistle shaft at Gibsonville had to be retimbered, owing to a movement of the ground twisting it out of shape.

Trinity.

MILLS RUNNING.—Journal, Jan. 24: We are informed that the two quartz mills on Canyon creek are now running on full time. The last rain-storm was a warm one and it increased the water supply to quite an extent. We expect good reports from the crushings done there.

Tuolumne.

AGAIN RUNNING.—Tuolumne Independent, Jan. 24: The Sonora Con., J. H. Neale, superintendent, reports that the mill is again running after being frozen up a week, owing to ice in the ditch. They have been getting out good rock all the time.

THE DEAD HORSE mine at Summersville is running again after being frozen up a week, the ice being so thick the mill could not run. A dozen or more men were engaged in cutting ice out of the ditch to get the water running.

NEVADA.

Wahoe District.

ALTA.—Virginia Enterprise, Jan. 24: The watchman reports that at 12 o'clock every night he thinks he can hear the sound of pick, drill and blast in the mine.

GOULD & CURRY.—200 level; Upraise No. 1, 70 feet from No. 2 crosscut, has been carried up 9 feet through old quartz showing some value; total height, 25 feet. 250 level: Work was resumed in west crosscut No. 1 and same was extended 15 feet through old filling of fair quality; total length, 45 feet. 300 level: At a point in the southwest drift, 225 feet from west crosscut No. 1, started and extended west crosscut No. 2 a distance of 30 feet; total length, 52 feet; formation porphyry with streaks of clay.

BEST & BELCHER.—800-foot level: West crosscut No. 1 has been extended 14 feet, passing through hard quartz showing some value; total length 432 feet. 1200 level: West crosscut No. 1 has been extended 16 feet through hard porphyry with small seams of clay; total length, 20 feet.

YELLOW JACKET.—Crosscutting on the 68th level and doing the usual work of exploration. Shipping 40 tons of ore daily to the Brunswick mill, the average battery assay value of which is \$18 per ton.

JUSTICE.—The north drift, 822 level, is out 227 feet. The face is in hard porphyry. We have commenced stoping fair-grade ore from the bottom of the 400 south winze. The stopes are yielding the usual amount of milling ore. Shipped to the mill the past week 191 tons and 485 pounds of ore. Average battery assay \$23.81 per ton.

CON. IMPERIAL.—Work is still being confined to following up and taking out small streaks of ore on the upper levels and overhauling the old stopes of the mine.

CONFIDENCE-CHALLENGE.—The joint Confidence and Challenge raise from the 750 level is up 139 feet, 9 feet having been added; the top is in quartz of no value. The joint Confidence and Challenge west crosscut from main north drift on the 1100 level is in 93 feet, 25 feet having been added, the face showing quartz of no value.

SEG. BELCHER.—The 600 level, south drift, has been extended 30 feet during the week, and is now out 100 feet; the face is in soft porphyry.

BELCHER.—Started a crosscut west from the south drift from No. 3 crosscut, 200 level, and it is now out 32 feet. It has passed through material composed of clay and porphyry, and which is still in the face. Started a west crosscut from the south drift in the west ledge, 300 level, which is out 60 feet and has passed through material composed of quartz and porphyry. The 1400 raise has been extended 13 feet during the week, and is now up 50 feet on the slope. The top is in low-grade quartz.

CROWN POINT.—The northwest crosscut on the 500 level was extended 23 feet during the week, and is now out 128 feet. The face is in soft porphyry. We are saving from six to eight cars of ore per day from the 1300 level.

OVERMAN.—Extracted 495 tons and 1200 pounds of ore. Car samples average \$15.17 per ton. Shipped to the Brunswick mill 493 tons 1260 pounds of ore.

KENTUCK.—The west crosscut from the north lateral drift, 950 level, was extended 15 feet during the week through streaks of quartz and porphyry, and has reached the footwall. Started an east crosscut opposite it Jan. 20th. Have started a north drift on the 1000 level in the east drift, which is out 10 feet; face is in low-grade quartz. Have started a raise from the east crosscut opposite the north drift opposite the 950 level. On this level have put in a switch and set of timbers in west ledge, preparatory to running north from the main east crosscut.

SAVAGE.—Milled 520 tons of ore, the average battery assay of which was \$15.75 per ton. Bullion

on hand, \$14,106. The winze below the 1300 level is down 65 feet; the bottom is in pay ore. Doing the usual amount of repairing work and bulkheading on the different levels.

TALE & NORCROSS.—On the 1400 level the north and south drifts from the station are now opened and extended 90 and 50 feet respectively. East crosscut No. 1 opposite the incline was advanced 25 feet; total length 50 feet; face in porphyry. In the north drift, 60 feet from station, started east crosscut No. 2 and west crosscut No. 1. These crosscuts were started opposite each other, and are each advanced 10 feet in quartz and porphyry.

CHILLAK.—Extracted and sent in the mill the last week 532 tons of ore, the battery assay of which, as per battery samples, was \$19.87 a ton.

EXCEQUEK.—East crosscut, 150 feet south of north line, 500 level, is out 410 feet; face in soft porphyry and clay. East crosscut near the south line, 600 level, is out 260 feet; face in clay and porphyry. East crosscut on the north line, 600 level, is out 36 feet; face in hard porphyry and quartz.

ALPIA.—The south drift from east crosscut from shaft, 600 level, is out 12 feet; face in quartz giving fair assays.

SILVER HILL.—Northeast drift, 160 level, is out from the winze 585 feet; face in porphyry. Northwest drift, 334 level, is out 820 feet; face in hard porphyry.

WARD COMBINATION.—East drift from shaft, 1800 level, is out 790 feet; face in porphyry.

OCCIDENTAL.—The upraise started last year 100 feet south of No. 3, on the 550 level, and carried up to the 500 and 450, has now reached a point where, in a few days, it will connect with the 400 level. This new upraise will greatly facilitate the working of that portion of the mine. The south drift from the bottom of 5 winze, on 650 level, is in 93 feet; face showing low-grade quartz.

UTAH.—On the 725 level the northwest lateral drift from the main west drift from the shaft has been extended 37 feet; total length 316 feet in a porphyry and clay formation. The west crosscut from this north lateral drift has been extended 19 feet; total length 25 feet. The face of the crosscut shows a mixture of porphyry and quartz of very low assay value.

ANOS.—During the past week north drift, 420 level, was advanced 15 feet through a formation of porphyry, quartz and clay. East crosscut from south lateral drift is advanced 15 feet through a vein formation.

Hawthorne District.

MINING RECORDER.—Walker Lake Bulletin, Jan. 21: An election for Mining Recorder of Hawthorne district was held at the Pamlico boarding-house last Saturday. W. S. Cooke of the Central mine was elected to serve for the ensuing year.

Pioche District.

SMELTER.—Pioche Record, Jan. 22: The furnace at the smelter has been given a thorough overhauling and everything points to a long run.

YUBA.—The night shift at the Yuba mine has been dispensed with and the full force is employed in the day-time only, causing a considerable saving to the company.

BULLIONVILLE.—There is a rumor around town that the Bullionville mine is likely to change hands, San Francisco parties having bonded a part of it and are figuring for the balance.

DAY ORE.—The Pioche Con. M. Co. recently shipped 150 tons of Day ore to Salt Lake City for reduction. This was done under orders from headquarters to see what market value the ore had, if any. The shipment was divided into three lots and sent to as many different smelters. Two of the smelters allowed for the lime contained, in addition to the silver and returned a profit. This ore was blown out and shipped without sorting, and the result indicates what we may look for when the railroad shall be completed, as 400,000 tons of similar stuff are estimated to be exposed now. The Day ore is worth in the market for fluxing, double the value of the silver contained in it, and it is this feature which makes the property so valuable, no mine similar to it being known of within 500 miles of us.

San Antonio District.

ASSESSMENT WORK.—Belmont Courier, Jan. 17: Peter Rice and his son William have finished the assessment work on some of the mines in San Antonio district.

Tuscarora District.

NAVAJO.—Tuscarora Times-Review, Jan. 23: Stopes below the 350-foot level are not showing as much first-grade ore as at last report.

DEL MONTE.—North drift, 1st level, advanced 12 feet, cutting seams of ore assaying from \$8 to \$10 per ton.

COMMONWEALTH.—First level: South drift from west crosscut advanced 18 feet on seam of ore. Joint raise up 34 feet, progress 17 feet, through low-grade vein matter to hanging-wall. Fourth level: East crosscut extended 33 feet; rock continues hard.

BELLE ISLE.—The stopes on the 350-foot level continue to produce a high grade of ore. Nine cars of very high-grade ore have been broken during the week; and 42 cars of a good grade of concentrating ore were hoisted. Joint east crosscut, 450-foot level, extended 13 feet, passing through the first parallel vein, which gives some fair assays in spots. South drift from west crosscut, same level, extended 20 feet without material change.

NORTH COMMONWEALTH.—First level: Joint raise reached hanging-wall at 34 feet, progress 17 feet, vein matter cut low grade. Resumed work in north drift on footwall, now in 10 feet from joint raise. Fourth level: North drift advanced 26 feet without change. South drift from west crosscut, second level, on vein 20 feet, ore occurring in bunches; assay from same \$34 per ton. Hoisted 19 cars of ore, assay \$331 per ton; 67 cars of ore, assay \$29 per ton.

NORTH BELLE ISLE.—A crosscut has been started east from the 400 north gangway opposite the crosscut to the vertical winze, progress five feet, cutting through 18 inches of good concentrating ore and showing seams of good ore in the face. The 500 stopes are not looking as well as at last report. Sixty-nine cars baby ore were broken. The upraise from the south end, 300 level, extended five feet and connected with the stopes. The concentrator crushed 300 tons, estimated assay value \$15.08, giving 26.26 tons of wet concentrates, estimated assay value \$143.45.

Tybo District.

LOOKING WELL.—Belmont Courier, Jan. 17: Henry Metz informs us that the 2-G mine at Tybo

is looking splendid. An important strike was made in this mine recently, and the discoverers say that the ore is of a good quality. This mine has been retimbered, and it is now in fine condition for working. Undoubtedly the work of extracting ore will soon be resumed. Mr. Metz firmly believes that Tybo will be a good mining camp in the near future.

ARIZONA.

CERBAT.—Mohave Miner, Jan. 24: John Barry is taking out a good deal of gold ore from the Cerbat mine which will shortly run through his mill. McLeish and Henson are taking out some unusually rich ore on their new discovery two miles east of Mineral Park. Their claim is near the old Baden-Baden, and said by those who have seen it to be very rich. Superintendent C. P. Park has let a contract to Mr. Mitchell to sink 100 feet on the Queen Bec, making a total depth of 170 feet when completed. Mr. Mitchell is working three shifts and making about two feet a day. The Empire is looking way up, in fact this property shows better for every day's work put into it. Superintendent Thompson now has a force of 16 men at work. The main shaft has reached a depth of 150 feet, and is in good ore. The mine will ship between four and five carloads of ore next week. Superintendent Benjamin, of Denver, has a large force of men at work on the Elkhart, and expects the daily output to be from 20 to 25 tons of high-grade lead ore as soon as he can put the mine in shape. The Rip Van Winkle tunnel has cut the ledge, and in the drift, started at the intersection, a fine body of high-grade ore has been encountered. Work on this tunnel has been vigorously prosecuted for the past year, and now Messrs. Jamison and Sample are to be rewarded for their faith and energy. The new tunnel taps the ledge about 200 feet below the old works and thoroughly drains it of water. Connection will be made with the old works as soon as possible and then stoping will be commenced in earnest. C. E. Sherman has sold the Distaff mine at Chloride to the Denver M. & M. Co., formerly the Denver Syndicate. The new owners have gone to work on the property with a will, and a contract to run the lower tunnel in 300 feet farther will be let in a few days. A hoist capable of sinking 100 feet, now on the road, will be erected shortly and the main shaft sunk 400 or 500 feet deeper.

COLORADO.

THE SILVER CREST.—Aspen Times, Jan. 24: The property is being worked by a shaft. This was not started until a short time ago. It is being sunk in a sort of basin and at 40 feet some ore was found, but the main vein is much deeper and the shaft will be continued down.

THE SAOOLE ROCK.—Manager Murphy of the Saddle Rock has let a contract to sink the shaft on that property 150 feet deeper and work will begin to-day. The present depth is 450 feet. From this level considerable ore was shipped, so there is almost a certainty of finding mineral at a point 600 feet down. The drift from the 450-foot station is also being run under contract. It is now 115 feet into the face. Yesterday the rock showed bunches of ore as if the vein was not far ahead. It is expected to strike the ore body from which shipments were made in the 90-foot winze.

THE ST. JOE.—The work on the St. Joe incline is going forward without interruption. Since Manager Murphy took hold, it has been sunk about 40 feet and is now down nearly 100 feet. It is in good ground and looks as if it might be in the vicinity of ore. However, the lessees are not expecting mineral so soon and have made their arrangements to go down 400 feet.

LOWER CALIFORNIA.

ALAMO.—Lower Californian, Jan. 24: Although the Princess mine has closed down temporarily, the actual work going on in Alamo is greater than ever before. The Princess mine developed very hard strata or dykes which cut the ore body into small spurs, and while nobody doubts that the ore collects into one large vein below the obstruction, it is clear that drilling and working by hand is too expensive. The mine was therefore closed down pending the developments on the Indio, where the fine new air compressor and steam drill will soon be at work. A Burleigh will no doubt be put into the Princess later on. The Aurora, joining the Princess on the East, is almost ready to resume sinking, the big boiler and hoist being in place. Russell & Rhodes have given orders to sink to a certain depth regardless of other developments so as to find out what there really is. Much interest is manifested in their operations, as theirs will soon be the deepest mine in the most important lode in camp. The Indio and Ulises are working day and night, and many chloids are working besides on various small sections of both. Some of these contractors are getting out rock running from \$100 to \$190 per ton. The shaft on the Scorpion is being steadily sunk, and the vein still holds good in width, and the rock seems to get richer. It will easily run \$100 per ton. The Scorpion mill is being put into excellent shape by Captain Selby, who has been engaged as superintendent by Mr. Mitchell. It will soon be ready to run. Frank D. Mason is doing good work on the Rainbow. The tunnel is in 200 feet, with a winze of 30 feet, and drifting has begun from thence into the hill. The mine is perfectly dry and Mr. Mason will shortly make another run of ore. J. O. Sheldon is still at work on the Rattlesnake, and getting out good rock. The Placer mine near by, is too full of water for profitable working. Farther down the gulch, N. Van Tassel is working two adarans on rock from his mine, and the rock runs as high as \$100, averaging about \$30. Plenty of water is running in the creek and it seems as if a mill would pay.

IDAHO.

QUEEN OF THE WEST.—Elmore Bulletin, Jan. 24: Pearson, Alexson and Adams are now stoping in their Queen of the West mine, and daily extracting large quantities of very rich ore, which is stored in bins till shipped. The ledge where stoping is being done is seven feet in width. These gentlemen will endeavor to build a small mill at the mine during the coming summer.

ELMORE.—Thursday, a drift was started at the 550-foot level of the Elmore shaft for what is known as the Elmore big ledge. This drift will cut the old

stand-by about 200 feet below the level of the old works, and it is estimated the big ledge will be tapped within 60 days.

WARRENS.—Weiser Signal, Jan. 23: This remarkable little camp is situated in Idaho county, a short distance over the Washington county line, and very isolated, everything being taken in by pack-train, causing all kinds of commodities to be held at very high prices. There are about 100 white men in the camp, and about 2000 Chinamen, who are working on the old placer mines. A good many more whites will arrive there next season. About 60 quartz claims have been located.

THE MAYFLOWER is owned by King, Johnson, Church and Gaskell, who have a five-stamp mill on their claim. The mill has been run steadily this season until the coming of winter closed operations; the ore worked more than paying for all improvements on the mine. A shaft 90 feet in depth is tapped by a 200-foot tunnel which runs for the whole distance through ore.

THE LITTLE GIANT is owned by George Riebold and has so far proved to be the best paying mine in the camp, it having been more thoroughly developed than any and the ore being very rich, running from \$100 to \$5000 a ton. A run of 13 tons of ore returned \$23,000. There is a five-stamp mill on the mine and about 200 tons of ore were worked in it this season.

THE KNOTT is owned by Gov. Norman B. Wiley. Three tunnels have been run on the ledge, the lower one being 90 feet below the upper one and has been run in the vein for 400 feet. The mill on Steamboat creek was moved to the mouth of the lower tunnel this season, and another 100-foot tunnel has been contracted for. The ore runs from \$25 to \$30 a ton.

THE KEYSTONE is owned by H. F. Randall. Twenty tons of ore worked last season in an arastra turned out \$80 a ton.

THE WASHINGTON worked 100 tons of \$40 ore in Wiley's mill before it was moved from Steamboat creek. The owners, Ockart, Warnham & Thompson, have been stoping ore all summer.

MONTANA.

AN OLD DISTRICT HEARD FROM.—Montana Mining Review, Jan. 20: The recent report of a strike in the West Point mine, located in Wallace district, about 20 miles east of Missoula, has been confirmed, and work is being rapidly pushed on the property. A shaft is being sunk on the vein, which, at 187 feet from the surface, is said to be entirely in ore, consisting of black copper, gold, silver and lead, valued at \$38 a ton, the ore body improving in size and richness as work progresses, the vein showing 19 inches of black copper ore. It is understood that there are about 400 tons of ore on the dump that will average fully \$25 a ton. The district in which this valuable property is located was discovered about 13 years ago, but its development has been retarded owing to a lack of capital and faith in the country, the value of which as a mineral region is only now being demonstrated.

BUTTE.—Inter-Mountain, Jan. 24: There has been little or no change during the past week in the material prosperity of the camp. The Anaconda mine is working at its full capacity, as is also its sister, the St. Lawrence, that joins the former on the east. Both mines are worked at every point and the whole of both properties is in a most prosperous condition. Since the resumption of these two big mines the Chambers syndicate of mines have not been as active, as will be seen from the number of men employed. The mines of the syndicate are being held in reserve for any emergency and for the future enlargement of the company's already mammoth works. Some of the larger mines, chiefly the Mountain View, have laid a portion of their forces off during the past week, owing to the inability of the smelting plant to dispose of its ores. The ore in this mine is beyond calculation, and is sufficient to keep the whole of the smelters in active operation for years. The Gagnon is employing more men in its depths than ever before in the history of this property and the immense engine is performing its work to the full satisfaction of all concerned. Of the Nettie, the same may be said. This is one of the prominent mines of the Colorado Mining & Smelting Company. Ore sufficient is being taken from these properties to keep the large smelter in full and active operation.

FLINT CREEK DISTRICT.—Phillipsburg Mail, Jan. 24: There seems to be no further doubt that the Flint Creek mining district in general, and Phillipsburg in particular, will experience a mining, business and building boom the coming spring and summer. Probably in no other mining district in the State is there as much activity among the poorer class of prospectors as there is at present in the Flint Creek district, nor is this activity confined alone to the poor prospectors, but outside as well as local capital is being freely and intelligently invested. Within the past month or so, two large and well-backed mining companies have been organized, and are now engaged in the development of their ground with the full confidence, respect and good wishes of not only the purchasers of stock but of every other person in the community.

EAST GRANITE.—The East Granite Co. is not only enjoying an enviable local reputation, but its fame seems to have extended far and wide. In the east drift of the 70-foot crosscut, ore has been found, and considerable of it too, that assays more than 100 ounces. The lead on this level is almost, if not quite, four feet in width, and improving as greater depth is attained.

THE BI-METALLIC.—This company has been doing a great deal of prospecting, and in the past year has started two new shafts—one on the Zeus, about 3000 or 4000 feet west of the main working shaft on the Blaine lode, and another on the Fanny Farnell, which lies between the Zeus and the Blaine. The Farnell shaft has three compartments, and very heavy machinery is being placed in position, which would indicate that the company intends to use it for another working shaft.

NEW MEXICO.

NO IDLE MINERS.—Silver City Enterprise, Jan. 24: There are no idle miners in Pinos Altos. Some very rich ore has recently been encountered in the Mammoth. E. J. Fender is working his prospect just east of the Giant and is taking out some excellent ore. There are now some 60 or 70 tons of high-grade ore on the dumps of the Osborn group awaiting treatment. J. W. Clark, lessee of the

Golden Giant, is taking out splendid ore and in sufficient quantity to pay a dividend on a capitalization of \$50,000. He is now working in the north drift of the first level, 160 feet from the surface. The Pacific mill, which was shut down for nearly two weeks on account of bad roads, is again running on regular time. The mine is producing its regular output of from 30 to 40 tons per day. The Key has been increasing its force of late. The 600-foot level is showing better than ever before. The south drift has been started at that depth and it is estimated that within 100 feet the free gold streak which was so rich on the 500-foot level will be struck. An exposure of 150 feet on the Auston & Thomas property shows a body of ore estimated at from 38 to 40 feet thick. The ore averages from 15 to 20 per cent lead and about \$20 in silver. It is probably the largest showing of ore for the work done in the West.

UTAH.

SMELTER.—Salt Lake Tribune, Jan. 23: A Tribune reporter was shown some letters yesterday regarding some mining transactions in which the writer said he was in correspondence with some men regarding the investment of a half-million dollars or more in a smelting and refining plant. They are investigating the question of placing such a plant in this valley, and the correspondence passing between the writer of the above letter and the Eastern gentlemen will, no doubt, result in bringing them to look over the field. The working charges and extra freights which the mines have to pay on ores sent East for reduction keep the margins so low as to leave but little above working expenses. Large reduction and refining works here will aid some of these properties to become prosperous and profitable mining enterprises.

SMELTERS WILL ENLARGE.—It is understood that the smelters below the city will enlarge their plants to some extent this year. The Mingo has been extending its capacity very much the past two or three years, and is not yet through. The Hanauer has also made additions and the Germania has been undergoing great changes, which increase its capacity.

CAMP CROSSCUTS.—Park Record, Jan. 24: The Glencoe now has four feet of good ore. It runs 42 ounces in silver and 30 odd per cent lead. Thursday was pay-day at the Ontario and Daly mines and mills and at the tunnel. It was a late pay-day, hence eagerly looked for. There is a fine deposit of alum over on the Provo river that is attracting considerable attention just now. It was recently located by a couple of Park City gentlemen. The Crescent concentrator was closed down Wednesday of this week, having finished all custom work on hand. It will do no more work this season other than to sample Crescent first-class ore, which is now coming down from the mine. Geo. Burton, manager of the Lucky Bill, was down from the mine this week, and from him we learn that the shaft on that property is down about 75 feet. Two shifts are being worked and everything is moving smoothly. The vein in the New York group is looking better as it is drifted on. It is composed of manganese and quartz and is very encouraging in looks and general character. The walls are very regular and give great strength to the numerous indications of ore. The owners of the Eagle's Nest are still prosecuting work on their group below town with increasing faith. They claim their property has been slandered and that the near future will prove their faith well founded. The Anchor management has decided to rebuild the hoisting works destroyed by fire, and the contract for the same has been let to Mr. E. A. Shear. The sampling works are practically closed down, as none of the mines are hauling but the Anchor, and will not until it snows. The fact of the matter is the weather is too awfully nice for the business of this camp to be very lively. The sampler employees were laid off on the 18th.

WASHINGTON.

LEDGE MATTER.—Okanogon Outlook, Jan. 23: Tunnel No. 3 in the First Thought mine, commonly called the Tonkins tunnel, is now in 330 feet, and being driven at the rate of three feet a day. The contract was for 675 feet of a tunnel. Thus it will be seen that nearly half of the work is completed, while only a little over one-third of the stipulated time has expired. John Wentworth is doing some development work on the Independent mine in John Arthur gulch. A tunnel has been run in to tap the main ledge, which, after opening up several small stringers of from two to eight inches in thickness at different points in its progress, crosscut the ledge 110 feet in and at a depth of 100 feet.

SILVER CREEK.—Sultan City Journal, Jan. 24: The Sultan City pack train will leave on Monday for Booth's Camp at the lake. The trail is in very fair condition with the exception of the portion between Gunn's and Scott's. Work is still progressing at the Silver Queen and Vandalia camos, and the boys are enjoying nice weather. The heavy rains and warm weather of the past week have reduced the snow considerably in the mountains. If the weather continues as it is, very little snow will remain at the mines in another month. It is expected that the spring work this year will open about the middle of April. Last year it was the last of June before anything could be done at Silver Creek.

A BILL has been introduced in the Legislature by Hawley of Santa Barbara requiring that all artesian wells in this State shall immediately, upon their completion, be capped or furnished with such mechanical appliances as will readily and effectively arrest and prevent the flow of water from such well.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well-known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and are able to judge of what is new and patentable. In this they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. P.) week to week and year to year.

MECHANICAL PROGRESS

Cold Saws in Shipbuilding.

A machine of recent introduction is what is called a "cold saw." This is simply a species of circular saw of fine steel, tempered somewhat hard, and about $\frac{1}{2}$ inch in thickness at the periphery; it is ground slightly thinner at its center to clear itself easily in a deep cut. It is made to revolve at a slow speed while it cuts through bars or plates of any section. This machine is almost indispensable where neat and accurate fitting is demanded.

There is not nearly much neatness in the framework of a ship, and therefore shipbuilders have not yet so largely availed themselves of the help offered by this tool as some other workers in iron and steel, such as bridge-builders. A few shipbuilders have found how it might be usefully employed, and doubtless it will, ere long, come into general service in all shipyards. It may be said that angle and other sections can be cut more rapidly by the shearing machine, or by a hot saw (so-called because it can only cut metal that has been heated to redness). True enough, but such bars cannot be cut with that accuracy to line and smoothness of finish which the cold saw gives. When a bar of angle iron has to be cut askew, for instance, usually it is first roughly cut off by the shears, and then it must be heated in a smith's fire, and, while hot, cut to the exact bevel required by warm chisels, and dressed by hammering, or by means of a "hot" saw it may be cut pretty accurately to line while hot. But in both cases a rough end is formed, and the expense of heating and dressing, or sawing hot, must be considerably greater than if it had been done at once by the cold saw.

For rough work that requires nothing better than the unfinished ends left by shearing, the saw is not necessary, and cannot thus compare with shears for economy. It is slow in its action, for it advances with its cut at the rate of about one inch per minute; but it is quick and economical compared with heating in a smith's fire and the delay of cutting and trimming by hand tools. And there are certain sections, such as Z and channel sections, which shears are hardly ever formed to cut. These, as well as round and square bars of large section, can be cut beautifully by the cold saw. The bar has simply to be placed on the table, so that its line of severance lies truly in the path of the saw. It is easily held fast by bolts in the slots on surface of table, and then the saw advances through the work. This machine differs from an ordinary circular saw in this respect, that it is not the work that moves up to the saw, but the saw is made to travel along the table through the work. It is driven by a worm-wheel and screw of some four or five feet in length, along which it can be moved easily by hand-screw gear or by self-acting feed gear. This feed gear can be quickly and simply detached when it is desired to run back the saw quickly by hand.

These machines are made by various tool-makers, without much difference in form. The large screw ought to be of steel and very smoothly chased, and the worm-wheel of some specially hard bronze composition. Bandsaws have also been used for cutting metals cold, but these are expensive, and can scarcely yet be said to be shipyard tools. Their place is more strictly in the engineering department.—*Engineering.*

ROLLING BOLTS AND THREADS.—At the Simmonds Rolling Machine Works, Fitchburg, Mass., there is a process in operation for forging articles by rolling. The rolling work is nearly all done between flat bars working vertically, and having the form cut into or raised upon the face. Quite a large business is done in making track bolts by the process, the head and threads being rolled hot. They have worked out the process of rolling threads with great nicety, and continue to make as clean and accurate, and of course much stronger thread than if it were cut. It appears that there are a great many articles used in car construction that may be made to advantage by this process. They are making the pins for standard brake rigging, and finish them almost as accurately as if they were turned in a lathe. This rolling process is much better adapted for doing accurate work than any other, for the thickness of any article is regulated by the distance the movable bars are kept apart, and this distance can be regulated as closely as ordinary callipers can be set. It is said that the threads of the rolled track bolts are so strong that they cannot be stripped by using an ordinary track wrench. It is thought that this would be a good process for the making of follower bolts, cylinder-head studs, steam-chest bolts and all other kinds of bolts and studs that are frequently broken by the tightening of nuts, causing much delay and inconvenience.

THE NAIL MANUFACTURE.—A correspondent of the *American Manufacturer*, in discussing the nail situation in Pennsylvania, says: During the past year there have been no improvements in methods of manufacture introduced, and no material changes have taken place. The use of pickled iron instead of the old scale iron plates has become much more general and has proven a great help to the business. Few iron nails are now made. Probably 1000 kegs would cover the entire product for the year, and they

were made on special orders sent in by consumers unfavorable to the steel nail. It is generally supposed that the wire nail is to blame for the general depression of the nail trade and the light demand, but Wheeling manufacturers insist that such is not the case. They say it is questionable whether the wire nail is increasing its percentage of sales as rapidly as the consuming capacity of the country is increasing. The cut-nail men say they met no opposition from the wire-nail men, and that the depression in their business is due to the rapid increase in the producing capacity, and the consequent overproduction.

COMBINED TOOLS AND HANDLES.—There has always been a difficulty in connection with what are known as hand-tools, such as hammers, picks, etc., in making an effective strong joint between the tool and handle. While the tool itself should be possessed of a definite and sufficient weight, the handle should be as light as compatible with strength, and for this purpose wood is the material that has hitherto been generally employed. But while this material has advantages in its favor besides that of a very general use from probably pre-historic times, there are disadvantages which are often too evident; these are want of strength, and looseness in the joint with the tool. The invention and introduction of the Mannesmann process for the production of tubes direct from metal blocks has rendered the invention of a tool combined with its handle possible. By means of the Mannesmann process, tubes can be produced having solid portions at one or more points of their length. These tubular rods may be made in any convenient lengths, with solid portions at regular or irregular distances apart, so that by cutting through each solid portion the rod can be divided up to a corresponding number of blanks for tools. By cutting each bar through at convenient points, each section will consist of a hollow part, which may be suitably shaped or bent to form the handle, and the solid part, which can be shaped into the tool-head by forging or stamping. Various tools are so formed, and it is obvious that they possess greater strength and durability than tools of which the handles form a separate piece.

A PECULIAR PHENOMENA IN WELDING.—Iron is now plated with nickel by pressure between rolls at a welding heat, the nickel being recovered from the clippings and shearings of the plates by the action of dilute sulphuric acid at a temperature of 55° C.; the iron is dissolved and the nickel is obtained in the form of thin sheets as it was melted upon the iron. The operation is complete when the evolution of hydrogen ceases—even fresh acid, at the same temperature, has practically no effect. But though the separation of the two metals is apparently perfectly made, a curious fact is noted, namely, that when the residual nickel is chemically examined it is found to differ from its original composition, the amount of iron present being notably increased. For example, in a nickel containing originally only .09 per cent of iron, 2 per cent more was found when it was recovered from the plate cuttings, and, even by a long-continued treatment with dilute acid, the iron could not be sensibly reduced. This peculiar behavior, it is believed, points to the possibility of positive chemical combination taking place between the metals, and that alloys of iron and nickel are produced in the process of welding—it being a fact well known to chemists and metallurgists that iron, with but even a small proportion of nickel, resists the action of acids much more effectively than the pure metal.

ELECTRIC WELDING MACHINES are coming rapidly into use. The company manufacturing these machines at Lynn, Mass., has orders for several months ahead of the capacity of the possibility of the supply. The company has a number of orders from the U. S. Government, one of which is for two large machines for welding steel for the navy-yard at Brooklyn and Norfolk. The machines will be of 100-horse power, and will be provided with accumulators and compressors. A machine to weld 2-inch chain is now being finished for the Charlestown Navy-Yard. It will weld steel as well as iron, and by the use of steel the tenacity of the chains will be increased about one-third. One of the welding machines is used by the Government at the Watervliet Arsenal for winding guns.

METAL FOR ELECTRO MAGNETS.—Speaking of mild metal in his recent lectures on "Magnets," Prof. Silvanus Thompson states that he has found this metal far superior to ordinary cast iron, and not much inferior to wrought iron, for electro-magnets. It is well known that the field magnets of dynamos and motors are made to certain forms, mainly to avoid expensive forging on the one hand or inferior results with cast iron on the other. In most cases a compromise is made by using good wrought iron for the straight cores and cast iron for the pole pieces, the latter involving difficult work, if forged out of wrought iron.

A "WATER ANNEAL."—It is now recommended as a good method of annealing steel to let it "soak" in the fire until red hot, as it heats more evenly, then take it from the fire and carry it to some dark place, allowing it to cool in the air until the dull red is no longer obtrusive in the dark, and finally cooling it off in hot water. This process is called the "water anneal."

SCIENTIFIC PROGRESS.

What Causes Expansion.

Why is it that all bodies expand when subjected to an increase of temperature? and why is it that some bodies expand more than others under the same conditions? It is well understood that all matter consists of an agglomeration of atoms and molecules, that these are subject to certain changes by the influence of heat, and that such change is accompanied by a change of volume of the mass. Heat has been demonstrated to be a mode of motion, and from this we must conclude that all bodies which contain heat are possessed of motion, and the greater the temperature the greater the motion. Those who have investigated the subject to their satisfaction have found that there is a temperature at which there is an absence of all heat.

Heat and cold are but relative terms, and do not refer to anything material, but are the results of more or less intense motion within the mass. As all bodies are affected by heat in a similar manner, but not to the same extent, different bodies expand more or less under the influence of an equal increase of temperature. Solid bodies, or those which for convenience are called solid (in reality no body is solid), expand the least. Liquids are affected to a greater extent, while gases expand more than either when subject to the same increase of temperature. Air and most other gases appear to follow a certain law in expanding and contracting. This law may be stated thus:

The volume of a gas under constant pressure, or the pressure of a gas at constant volume, varies as the absolute temperature. Absolute temperature is understood to mean the temperature reckoned from a point far below the zero of any of the thermometers commonly in use. This point is called the absolute zero of temperature, or the temperature at which it is considered that no heat exists. If such is the case, and none of the phenomena of heat are manifest at this temperature, then wherever such temperature is found there would be no movement whatever, everything would be—not dead really, for heat would restore movement, but in a far different condition from what we are accustomed to find them.

The absolute zero of temperature is 461° below the zero of the Fahrenheit scale, or 273° below the zero of the Centigrade scale—a temperature at which all substances are devoid of motion, for motion cannot exist without heat—no motion, no heat. Cold and motionless in the fullest sense of the words. The absolute zero of temperature has never been reached by any physical research, but in laboratory experiments a temperature of 373° F. has been produced by expansion in liquefying air, oxygen and nitrogen. This temperature is more than four-fifths the distance between the zero of the Fahrenheit scale and that of the absolute zero.

Were it possible to reduce the temperature 88° more, the liquefied air would become a solid, devoid of atomic motion, contracted, compressed, an absence of all heat. From this condition a slight addition of heat imparts movement to the atom, which causes dilation of the mass; it expands. More heat being added, the velocity of movement is increased and the volume of the mass grows greater. In the case of a solidified gas, the increase of temperature continues to produce expansion in the body until the temperature of liquefaction is again reached; but here a temperature due to both a solid and liquid condition is maintained, while the mass absorbs a given amount of heat and is wholly changed into a liquid before any increase in temperature is apparent, the surplus heat being necessary to produce the work required to bring about a change of form, and this heat is absorbed and becomes latent, until the liquid again becomes solid, when the same amount of heat that was absorbed is set free.—*Correspondence of the Manufacturers' Gazette.*

HOW ELECTRICITY IS "STORED."—The energy which a current may at any instant be said to possess is immediately transformed into heat in the circuit, which will under certain conditions produce light; into chemical energy; into motion, which may or may not produce sound; or into magnetic and electrotonic conditions. The last may either be permanent or have the same evanescent existence as the original current. When electricity is employed to charge a storage battery, writes Prof. Samuel Sheldon in *Popular Science Monthly* for January, only that part which is transformed into chemical energy is need. The rest is dissipated. The battery, then, instead of being a place where electricity is laid away, is a place where chemicals are left by the current, with the expectation that they will in turn produce a current when called upon. This may seem a fine distinction, but it is only apparently so. For instance, the current might be produced by a dynamo turned by Niagara water-power. The chemical left by it might be zinc deposited from a solution of zinc sulphate. This might be transported, preserved, bought and sold, and finally be employed by some physicist to produce another current. Were the electricity itself stored in its original form, then the imaginative reader can best tell what would become of it and how it must be handled.

DANGER OF FIRE FROM THE USE OF CHLORATE OF POTASH.—Attention has been drawn to

the danger of fire in the use of chlorate of potash, sugar and nitrate of ammonia in the manufacture of tablets. While it is generally known that chlorate of potash, together with organic matter, forms a powerful explosive, it should be understood that, under certain conditions, it is an agent in producing fire without an explosion. Sugar alone requires a temperature of 600° F., and if an accumulation of dust or particles of the two ingredients named should form a mixture on the steam pipes of a factory, a fire might be caused. It is, therefore, urged that the manufacture of the chlorate of potash and nitrate of ammonia tablets should be restricted or prohibited as being dangerous to the welfare of the community.

Influence of Light on Color.

Some years ago an English manufacturer of carmine, who was aware of the superiority of the French color, went to Lyons for the purpose of improving his process, and bargained with the most celebrated manufacturer in that city for the acquisition of his secret, for which he was to pay \$5000. He was shown all of the process, and saw a most beautiful color produced, but he found not the least difference in the French mode of fabrication and that which had been constantly adopted by himself. He minutely examined the water and the materials, which were in every respect similar to his own, and then, very much surprised, said: "I have lost both my labor and my money, for the air of England does not permit us to make good carmine."

"Stay!" said the Frenchman, "don't deceive yourself; what kind of weather is it now?" "A bright, sunny day," replied the Englishman.

"And such are the days," said the Frenchman, "on which I make my color; were I to attempt to manufacture it on a dark and cloudy day, my results would be the same as yours. Let me advise you, my friend, only to make your carmine on bright, sunny days."

The moral of this will apply quite as well to the making of many other colors used in manufactures and also in the fine arts, for it illustrates, in a practical way, the chemical influence of light upon certain coloring compounds or mixtures.

POISON-PROOF ANIMALS.—Neither difference of organization in animals nor in the constitution of the poisonous substance generally afford any clue for interpreting an exceptional want of effect, writes W. Bernhardt in *Popular Science Monthly*. Unaccountable is the immunity of rabbits against belladonna leaves (*Atropa belladonna*, deadly nightshade). You may feed them with belladonna for weeks without observing the least toxic symptoms. The meat of such animals, however, proves poisonous to any one who eats it, prolonging the same symptoms as the plant. Pigeons and various other herbivora are also to some degree safe from the effects of this poison, while in warm-blooded carnivora it causes paralysis and asphyxia. In frogs the effect is a different one, consisting of spasms. The meat of goats which had fed on hemlock has sometimes occasioned poisonous effects. Chickens are nearly hardy against nuxvomica and the extremely dangerous alkaloid, strychnine, contained in it, while in the smallest amount it is a fatal poison to rodents. More remarkable yet in this respect is the immunity of *Choleopus Hoffmanni*, a kind of sloth, living on the island of Ceylon, which, when given ten grains of strychnine, was not much affected. Pigeons are possessed of high immunity from morphine, the chief alkaloid of opium, as well as from belladonna. Eight grains were required to kill a pigeon, not much less than the mortal dose for a man. Cats are extremely sensitive to fox-glove (*Digitalis purpurea*), which on the contrary may be given to rabbits and various birds in pretty large doses.

PINTCH GAS is a new illuminating gas coming into use for lighting cars, etc. It is a distillation from crude petroleum, and is produced by passing the oil through heated iron retorts. The product, a permanent gas of great richness and brilliancy, is then forced through water seals which thoroughly purify it. Finally it is stored in cylinders of unusual strength, where it is subjected to a pressure of 150 pounds to the square inch. These cylinders are placed beneath the coaches and by means of an automatic graduating valve, which insures uniform pressure, the gas is conducted to the lamps above, where it yields a light which is four times as powerful as ordinary gas light.

TELEGRAPH AND TELEPHONE MESSAGES are now sent over the long-distance telephone wires at the same time that they are in use for telephonic communication, without one interfering with the other. This may give the country a telegraphic system which will prove a successful rival of the Western Union.

SULFUROUS ACID is now being used to act upon starch under pressure and at a high temperature. The product, after neutralization, is Schumann's universal gum, which is soluble and extremely adhesive, and closely resembles gum arabic, which is now very scarce and dear.

A PLEASANT HOUSEHOLD DEODORIZER is made by pouring spirit of lavender over lumps of bicarbonate of ammonia.

GOOD HEALTH.

THE PATHOLOGICAL EFFECTS OF THE ELECTRIC LIGHT.—Attention has been drawn to the advisability of the adoption of early remedial measures by those who are suffering from the effects of a too long exposure to strong electric light. The "tired" sensation in the optic nerve, which such exposure causes, and the local inflammation which accompanies it, are both due to the fact that the luminous waves proceeding from a powerful electric lamp are of very great intensity. The general symptoms induced in the eyes of people who have been exposed to the glare of unprotected lamps for too long a time are: 1, transient irritability of the retina; 2, local inflammation; 3, tears and "dashing" of light before the eye; 4, incipient paralysis of the eye. Usually people experience sensations which are analogous to those which are felt when particles of foreign matter are present beneath the eyelid. In order to prevent the sight being permanently injured, it is necessary to adopt hygienic shades, though these do not act thoroughly in reducing the intensity of the luminous waves. Rest must be sought and the pain relieved by the application of cold-water compresses. When the pain is almost unbearable—a calamity frequently suffered by those who have been exposed for many hours a day to the glare of powerful lamps—a medical man may relieve it by the injection of cocaine and atropine. The French call this peculiar malady "electrical sunstroke."—*Ex.*

DIPHTHERIA IN CHEWING-GUM.—A contemporary thus calls attention to the possible spreading of diphtheria through chewing-gum: "The practice of chewing gum has become very wide spread. It is not a very elegant habit; to many it is positively repulsive; and there are scores of danger, too, that should not be overlooked. A case in point was related to us a few days ago. Diphtheria broke out in a family in East Des Moines. After the child had recovered, the clothing and all the exposed articles fully disinfected, the parents, with the convalescent child, visited some relatives in the country. The indispensable chewing-gum, like Sataw, went also—in the mouth of the little child. Prompted by generosity, it allowed its country cousins, two children, to chew also the gum previously chewed by the visiting child. In three or four days, without any other known source of infection than the chewing gum, the two children were simultaneously stricken down with diphtheria in a most serious form. It would be hard to imagine a more successful mode of propagation—distributing the disease. It would be a great deal safer not to chew the stuff at all, but if it must be done to satisfy the demands of a weak head and a depraved appetite, our advice is, don't 'swap' gum to chew anybody's else gum, nor allow anybody else to chew yours."

CURATIVE USE OF CHARCOAL.—Charcoal is valuable as fuel, but it has other uses which make it one of the most serviceable of articles. When laid flat, while cold, on a burn, it causes the pain to abate; by leaving it on for an hour the burn seems almost healed when the wound is superficial. Tainted meat, surrounded with it, is sweetened. Strawn over heaps of decomposed pelts or over dead animals, charcoal prevents unpleasant odors. Foul water is purified by it. It is a great disinfectant, and sweetens offensive air if placed in shallow trays around apartments. It is so very porous that it absorbs and condenses gases rapidly. One cubic inch of fresh charcoal will absorb nearly 100 inches of gaseous ammonia. Charcoal forms an excellent poultice for malignant wounds and sores. In cases of what is called pruritis, it is invaluable. It gives no disagreeable odor, corrodes no metal, hurts no texture, injures no color, is a simple and safe sweetener and disinfectant. A teaspoonful of charcoal in half a glass of water often relieves sick headache. It absorbs the gases and relieves the distended stomach, pressing against the nerves which extend from the stomach to the head.

RECOVERATIVE POWER.—The ready recovery from wounds and the success of grave surgical operations during our Civil War, under circumstances which were, on the whole, less advantageous than those which attend the conduct of war in Europe, prove that the American body has more recuperative power than that of the European.

IN A FAINT.—The common practice of raising fainting persons to sitting or upright position is often sufficient to destroy the spark of life which remains. It is much better to keep such persons in the prone position while restoratives and local means are adopted to enable them, if possible, to regain consciousness.

FOOTBALL CASUALTIES.—The London *Lancet* furnishes this list of football casualties from all over the world during the last season: Deaths, 13; fractures of legs, 15; of arms, 4; of collar-bones, 11; serious injuries to spine, 5; to nose, 1; to knee, 1; to ankle, 1; to cheek, 1.

HARTLEY'S PROCESS.—A small plant for reducing the rebellious ores of Meadow Lake district has been put up by Mr. Hartley at Cloco, and will be run as soon as a thaw releases sufficient water. The process is Hartley's invention, and it is said that no trace of gold is left in the tailings.—*Placer Republican.*

STEAM BOILER NOTES.

HIGH-PRESSURE BOILERS.—The fear of high-boiler pressures that existed only a few years since in the minds not only of the public, but also of many engineers, is rapidly disappearing before the results of modern practice; and it is furthermore asserted that the statistics of boiler explosions in England and France prove that the low-pressure boiler explosions have been the more frequent and more disastrous. Several reasons have been given for this, but the following would seem to be the most conclusive: The law requires that every new boiler and every old one, after it has undergone extensive repairs, shall not be sent out of the shop or be put into service until it has been tested to double the effective pressure under which it will be worked. A heavy boiler which is to work with a pressure of 120 pounds to the inch must be able to carry from 240 to 300 pounds pressure, which corresponds to a temperature of from 397 to 416 degrees F. These are conditions that will rarely be attained, even with the most careful attendance; while it is comparatively easy to rupture a low-pressure boiler, since the test pressure may not exceed 45 or 60 pounds at the most, and this corresponds to a temperature of from 274 to 292 degrees F., these pressures being regarded as the absolute above the vacuum, as that is the basis upon which the foreign boilers are tested. It will readily be seen that the latter temperatures are readily reached, even with slow fires. Furthermore, high-pressure boilers require more perfect construction, on account of the very weakness that they have a tendency to develop. The sheets in contact with the water and steam radiate an amount of heat that is quite intolerable to the attendants, and they must, therefore, be covered with non-conducting materials and air spacer, and this involves constant care and attention. Their advantage is so apparent, from the success attending their use, that the whole tendency of modern steam-engine practice is toward higher pressures and the use of engines with a high rate of expansion, whether they are used with or without a condenser.—*Safety-Valve.*

FOAMING IN BOILERS.—When boilers are new and first used, they are liable to foam, in consequence of grease or oil left in them during their manufacture. The simplest remedy for this is to put from one-half to one pound common washing soda in the boiler when first filled with water. After steam has been raised and the soda has neutralized the oil and grease, draw the fire, and when the pressure of steam has been reduced to not exceeding five pounds, blow out the boiler, then fill with fresh water, adding a very small quantity of soda to neutralize any grease remaining within the boiler. The general cause of boilers foaming is using the steam faster than the fire is generating it, as any boiler can be caused to foam by drawing the steam from it faster than it is being generated. The remedy in this case is to close the throttle so as to reduce the quantity of steam discharged in proportion to the amount being produced, increase the fire so as to make more steam, and the quantity available for service will be in accordance, without danger of foaming.—*Safety Valve.*

WASTE OF STEAM.—Every stroke an engine makes above its normal speed is a waste of steam, and if the engine be large, a vast waste of fuel takes place; on the other hand, a loss in speed reduces the production of the whole factory in direct proportion to that reduction of speed, the loss of one revolution in twenty reducing the capacity of every machine five per cent. A variation of one revolution in five in a throttling engine is common, and in most cases is unavoidable. There are some engineers who still think that this class of engine can compete with the automatic cut-off engine, but it is, nevertheless, a remarkable fact that they take every precaution to avoid throttling in the passages. Happily these relics of a bygone age are becoming fewer in number. If the practice of estimating the efficiency of a steam engine by its consumption of steam were more common in this country than it is at present, we should hear very little of "throttling." The present practice of estimating the efficiency by the coal consumption (involving as it does the efficiency of both the engine and the boiler), is fair neither to the maker of one nor the other.

THE STEAM CYLINDER.—A good deal of recent discussion brings out prominently once more how little the wisest really know about the behavior of steam in the cylinder of a steam engine. Just now the discussion as to the utility of the steam jacket is in the front, and the conflicting testimony and opinions are anything but reassuring. The unprejudiced engineer is likely to conclude, from all this discussion, that there are cases where the steam jacket represents economy; also that there are cases where it brings about the reverse. But just what brings about this difference no one is wise enough to tell. What is needed is further knowledge of the law governing the condensation of steam in the cylinder of a steam engine; how it is affected by different conditions, etc. Then from this as a standpoint, figures can be made to apply to steam jacketing. Until a good deal more is learned about condensation of steam, the doctors will disagree as to the value of any means tending to prevent it.—*American Machinist.*

USEFUL INFORMATION.

WASH SILKS AND RAMIE.—The class of goods known as "wash silks" contain, in reality, but very little of the product of the silkworm. Like most inexpensive oriental silks, wash silks consist largely of ramie fiber. This superior vegetable fiber has long been used in the makeup of silk goods. It is about as fine as the product of the silkworm, and is finer and stronger than flax. Ramie is often mixed, carded and spun with silk floss and waste. Pongee silks are commonly composed of this mixed material. Wash silks often consist of a wool of one material and a web of the other. They are always calendered—that is, passed over hot rollers to give them a gloss silken finish. This makes them more attractive on the shop counters, but causes them to spot with water until this finish has been removed by sponging. The improvements made of late years in the manufacture of ramie have materially affected the cost of low-priced silks, and bid fair in time to make such "silks" as cheap as cotton, especially when the superior wear of the former is taken into account. There is no reason why ramie should not be sold under its own name. It has virtues of its own apart from silk, one of which is that it can be washed, and it certainly is not improved by mixing with silk. An effort is now being made to establish ramie culture in this State, for which our climate and soil afford special advantages. It will grow almost anywhere in the State, even on our poorest or worn-out wheat-lands. It is said that even a moderate amount of alkali is no hindrance to its growth or quality.

FIRE PROOF SHUTTERS.—A useful invention has been brought to notice—namely, a device for opening and closing fire-proof shutters from the outside with water pressure from the hose, and their easy operation from the ladder, under the management of the fire department. The mechanism provided for opening and closing the shutters from the inside without raising the windows, is a feature of special convenience and protection to the occupants of a building. This device, it is stated, can readily and inexpensively be applied to the ordinary shutters in use.

WHITE PITCH is a new article coming into use for ship-builders and others. It is designed to supersede the usual laborious, expensive and inadequate method of treating decks by working putty into the seams with a knife. The peculiarity of this white pitch is, as claimed, that it is the only material of white color yet introduced that can be run into deck seams in a hot state like ordinary pitch. It is also said to be especially suitable for hot climates, as it will stand the sun's heat and not melt out of the seams.

A STARTLING ADMISSION.—"What becomes of all the stale candy?" was asked a well-known confectioner. "It is made up into fresh candy." There is not an ounce of waste about confectionery. You like obnoxious caramels? Well, they contain more scraps than any other candy. They are especially adapted for this on account of their dark color. They were first made by a confectioner who received the inspiration from his great stock of stale sweets.

THE LUMBER CUT of the northern coast for 1890 is set down as follows:

	Feet.
Puget Sound Mills (14).....	779,330,012
Gray's Harbor (7 mills).....	117,500,000
Willapa Harbor (2 mills).....	38,000,000
Columbia River (7 mills).....	87,000,000
Between Kalama and Tacoma (11 mills).....	93,000,000
All others (16 mills).....	108,000,000
Grand total.....	1,222,330,012

BEAUTIFUL EFFECTS may be imparted to water-color drawings by causing gold to shine through some of the transparent colors. This is done by attaching gold leaf with mucilage to shaded parts, the gold leaf being taken up and pressed down with cotton wool. As leaf gold will not receive water colors regularly, it should be first stroked over with some water or oil.

SWORD SCABBARDS are now made so that when the sword is withdrawn the upper part of the scabbard contracts to one-half its length, and consequently is much more convenient during the period of action. When the sword is returned to the scabbard, it resumes its usual form.

A MINING COMPANY'S CLAIM.—An action has been brought in the United States Circuit Court by the Waterloo Mining Company to recover \$462,000 from John S. Doe and Bartlett Doe. The complaint sets forth that in February, 1889, the defendants took 30,000 tons of ore, valued at \$30 a ton, from the Silver King and Quartz Mining Claim, and \$162,000 worth of ore from the Monmouth and Red Cloud tunnels, both of which properties belonged to plaintiff. Also, that since the 10th inst., the defendants have taken \$50,000 worth of ore from these same properties.

THE Southern Pacific Co., after test trips to see whether wood or coal was cheaper for running their locomotives over the mountain division, find that there is a slight advantage in favor of coal.

ELECTRICITY.

The Science of Electric Welding.

A paper of considerable length, and very comprehensive in its exposition of the science of electric welding, was read by Hermann Lemp before the general meeting of the American Institution of Electrical Engineers at Boston, May 21, 1890. From it, as reported by the *Electrical World*, the following extracts are gathered:

Among the latest achievements in electro-technics stands prominently Prof. Thomson's electric welding process. The broad underlying principle has often been described and exhibited. The evolution of a new process and its reduction to practice for commercial purposes, especially if the leading elements of its working are novel in themselves, must necessarily open a vast field for investigation. Such is the case with electric welding; and with a view of showing the commercial apparatus of to-day, it will be necessary for me to state the electrical and mechanical requirements that led to its construction.

The reason for which machines have been invented has been for the purpose of reproducing faithfully and constantly a set of conditions necessary to obtain a certain result. When the conditions in any case are few and the product simple, generally the design of machine will be sufficient. With an increased number of conditions, however, the complexity of the apparatus increases rapidly and demands, in many cases, subdivision into different processes to be executed by separate machinery. What constitutes skill, in a workman, for instance, is the ability co-ordinately to reproduce a number of operations or movements; to be, in other words, a perfect machine, or to produce the same result even if other conditions than those previously contemplated should arise.

To secure uniform results in the practice of a difficult operation, there are two ways possible:

1. To employ skilled help for the complex portion of the work alone.
2. To substitute for the more complex portion of the operation one more readily controlled.

The ordinary welding process requires the greatest skill at the hands of the blacksmith for heating the metals to the proper temperature and at the right spot, while preventing the accumulation of cinder or scale. While skill may be successful with metals of high melting points and low conductivity for heat, easily fusible metals and especially good conductors fail all attempts as long as an exterior heating source is employed.

The electric welding process has not only made it possible that operators not particularly skilled in the art of blacksmithing can produce good substantial welds, but has created an art equally adaptable to all metals and combinations of metals.

The following are all the metals, alloys and combinations so far actually welded with success by the Thomson process:

Metals.
Wrought iron, cast iron, malleable iron, wrought copper, cast copper, lead, tin, zinc, antimony, cobalt, nickel, bismuth, aluminum, silver, platinum, gold (pure), manganese, magnesium.

Alloys.
Various grades of tool steel, various grades of mild steel, steel castings, chrome steel, malleable steel, brass steel, crescent steel, Bessemer steel, cast brass, gun metal, brass composition, fuse metal, type metal, solder metal, German silver, aluminum alloyed with iron, aluminum brass, aluminum bronze, phosphor bronze, silicon bronze, coin silver, various grades of gold.

Combinations.
Copper to brass, copper to wrought iron, copper to German silver, copper to gold, copper to silver, brass to wrought iron, brass to cast iron, tin to zinc, tin to brass, brass to German silver, brass to tin, brass to mild steel, wrought iron to cast iron, wrought iron to mild steel, wrought iron to tool steel, gold to German silver, gold to silver, gold to platinum, silver to platinum, wrought iron to malleable steel, wrought iron to steel, wrought iron to crescent steel, wrought iron to cast brass, wrought iron to German silver, wrought iron to nickel, tin to lead.

But Prof. Thomson was not satisfied with this progress made above ordinary welding; he early recognized the importance of a machine in which all conditions for successful operations are mechanically controlled to produce uniform results, work rapidly and require little or no attendance.

Such machines, now known as automatic welding machines, have proved to be of special importance in connection with easily fusible metals, enabling the successful welding of aluminum, silicon and aluminum bronze, which require even with the electric process a considerable skill. The machines are very simple in the construction and operation, and require less skill than is requisite in ordinary welding operations.

A NEW mining district has been formed on the East Fork of the Walker river, Nev., including the recently discovered or evolved placer diggings.

SHASTA, Shasta Co., wants a custom quartz mill and reduction works.



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Passing Events.

It will be a matter of surprise to other communities to know that a California Legislature has amended a bill before it so as to practically prohibit the construction of electric roads operated by the overhead wire system. As this system is the only one thus far practically operative, it is a virtual prohibition of electric roads in cities of the first class. The amendment is not conclusive, however, and the more liberal members may yet see the mistake that has been made.

The explosion in the Mammoth coal mine, Pennsylvania, by which 151 men lost their lives this week, was one of the most disastrous accidents in the history of American coal mining. Naked lamps were used, as the mine was not considered dangerous, but this terrible disaster will doubtless result in more stringent measures being taken in the collieries of the district for the protection of the miners.

The continued dry weather this winter is not good for the best interests of the State. Not only do the agriculturists suffer, but now that water-power is so largely used in mining, it is probable the miners will suffer from a scant supply next season.

A PACIFIC CABLE.—Senator Mitchell has introduced a bill to incorporate the Pacific Cable Company, with a capital of \$5,000,000, to operate a cable between San Francisco, Hawaii, Panama, Samoa and Japan. The majority of the directors must be citizens of the United States. The Secretary of the Treasury is authorized to pay to the company an annual subsidy of \$200,000 for 15 years.

By an explosion in the Mammoth shaft of the H. C. Fricke Coke Co.'s mine, Scottdale, Pa., on Tuesday last, 151 miners were killed and several others injured.

The State Mining Bureau.

A Well-Managed Institution and Much Good Work Done.

If, in his search after fossils, the skillful paleontologist come upon any hit of animal remains, however ancient or however unique, he will be able to reconstruct the creature to which they belong, describing its size, habits and appearance with wonderful accuracy. The fragment inspected may consist of only a single bone, and yet our man of science will tell you, with much exactness, the style of animal of which it originally formed a part, and this even though such animal were of strange and monstrous form, and belonged to a race extinct long ago.

In like manner would the archaeologist, visiting our public libraries or rummaging through the crypts and lumber-rooms of the Capitol, conclude, from some fragments of maps, field-notes and odd volumes there found, that there had once been a geological survey of this State planned and partially completed. Studying the character of these remains, our archaeologist would arrive at the further conclusion that this survey had been projected, and, so far as carried out, prosecuted on a grand, costly and comprehensive scale, all which speculations and conclusions would be entirely correct, for the people of California, now many years ago, really did undertake and carry through its preliminary stages a work of that kind—a law having about that time been enacted by the Legislature making provision for the same. In pursuance of this law, Prof. J. D. Whitney, a most capable man, was selected to take charge of this work, which, when it had been in progress for two or three years, was arrested through failure of the Legislature to make further provision for its support. Of this failure it is enough here to say it worked every way to the prejudice of California, hurting alike her good name and the material interests of the State.

Later on, it began to dawn on the popular mind that a great mistake had been made in thus permitting the Whitney Survey to be prematurely strangled to death. Looking abroad, it was perceived that almost every other country in the civilized world had made provision for having its geology and its mineral resources examined and reported upon in an official way. States making no pretensions to a large mineral wealth, and several of them not half the size of some California counties, had yet thought it worth while to give careful attention to such slender resources in this line as they happened to possess. Some of these sovereignties, though they had little else than granite and marble to boast of, kept, nevertheless, a learned geologist all the while in the field, and from whom an elaborate report was yearly exacted.

Seeing all this, and noticing how strongly it contrasted with conditions at home, our people finally determined that another effort should be made to create the office of State Geologist or something that would serve in its stead. In accordance with this determination, the Legislature at its session in 1880 passed an Act creating the office of State Mineralogist, and at the same time an institution known as the State Mining Bureau, to be superintended by that official, for the support of all of which very scanty provision was made. In remarking on the insufficient outfit of the Bureau, a city daily makes the statement that it consisted of no more than "a microscope and a table," to which, however, should have been added a chair of the cheap wooden sort.

Thus equipped and provided for, the first State Mineralogist, Henry G. Hanks, commenced business, opening up in the third story of a dilapidated building on Pine street. The establishment became perpetually from the start, the endeavor to realize always a lower rent having compelled its frequent removal from one rookery to another. In these removals, effected at first with a wheelbarrow and later on with an express wagon, we have the earliest conception of "California on Wheels!"

But despite these adverse beginnings, the institution kept on its feet and grew apace. Hanks was a hard worker, and besides discharging the duties pertaining to his official position, managed to get through with much else, a good deal of it mere drudgery, his single assistant doing the while as janitor, messenger, assayer, librarian, etc. What rendered the

task of both the more arduous was the fact that neither of these men had then learned, nor have they since learned, the art of shirking any duty imposed upon them or of slighting any work given them to perform.

Picking up where he could, or acquiring through donations made by individuals, or by means of exchanges effected with similar institutions elsewhere, the first State Mineralogist gradually accumulated a very respectable mineral cabinet, which, through recourse to like methods, has since been kept growing by his successor, Wm. Ireland Jr., present incumbent of the office. Meantime, California, mainly through the exertions of the Mining Bureau, succeeded in having her mineral and other more important sources of wealth fitly represented at the Paris and afterward at the New Orleans Exposition, and at neither of which would the State, but for these exertions, have been able to make anything like a creditable display, or perhaps any display whatever.

Tracing down the history of the Mining Bureau, we find it adding to its mineral collection and its art treasures year by year, the objects of its care having been at the same time greatly multiplied and the sphere of its usefulness much extended. Besides the many benefits it has conferred on our several mining industries, aiding them in all their departments and branches, the Bureau has been of no little service to our agricultural, commercial and manufacturing pursuits. There is not, in fact, an interest or calling in the State but what has been greatly helped by it in either a direct or an indirect manner.

While accomplishing so much good, this institution has virtually cost the State nothing. It is calculated by competent judges that the collection of mineral specimens, curiosities and articles of virtue gathered up and now on exhibition in the museum of the Bureau possesses an intrinsic or commercial value equal to all the money that has been appropriated for the uses of this institution since it was founded; in other words, this magnificent collection stands a free gift to the commonwealth of California!

Has any other arm of the public service done better than this? We think not; nor do we believe any other can show a better financial record. The State Mineralogist has been able to account satisfactorily for every dollar that has passed through his hands or been intrusted to his care. The Bureau has been in nothing delinquent, nor has it been hemisrched with any scandal whatever. Its history is a clean one, creditable alike to the State and the men who have been responsible for its management. In view of all which it is to be hoped that the Legislature will feel warranted in voting this institution such allowance as will enable it to continue the geological survey already begun and suffice to maintain it in its present state of efficiency. To compel now, through an insufficient appropriation, an abandonment of that work, or to otherwise cripple the usefulness of the Bureau, would prove very disappointing to its many friends, both at home and abroad. We will not, however, insult the intelligence of the Legislature by presupposing it capable of pursuing a policy so short-sighted and illiberal. Consulting alike the desire of the miners and the interests of the State at large, we believe our law-makers now in session at the capital will, before they adjourn, make ample provision for the support of this highly popular and well-deserving institution.

Mining-Law Changes.

We republish this week the text of the Mineral Land bill now pending in Congress, adding those sections which were omitted in the Press in the previous publication. Some amendments to the text have been made by the House Committee, but these have not yet been acted upon.

It will be noted that where there are five adjoining claims owned or held by the same person, the assessment work done on one will answer for all, provided \$500 is expended.

The month in which assessment work shall be completed is also changed from January to October, so as to avoid the necessity of beginning the work in mountainous regions in mid-winter. There is also a very radical change in that matter of date. Under the new bill it is provided that half the work must be done before October 1st, and the other half may be done after that date. This is to prevent the

present plan of not doing any work at all until the morning of the day when the time is up.

It is also provided, in cases of contest as to the mineral or agricultural character of the land, that the presence of rock in place bearing gold, silver, cinnabar, or other valuable metal, shall be regarded as prima-facie evidence that the land containing the same is mineral in character. So far, so good, but this should go further, and require the affidavit of a deputy mineral land surveyor or other expert. The trouble now is that the proof required is negative, that is, the agricultural claimant says, as far as he knows, there is no mineral, and unless there is some one to disprove this and show there is mineral, the land goes to the agricultural claimant. In this way much valuable mineral land has been illegally withdrawn from the public domain, where a simple examination would often show the presence of mineral.

The bill has not yet become a law, and there may be many changes in the text before it does.

Electric Roads.

Under the present laws of California, there is no warrant for large cities granting franchises for electric railroads, and the matter was brought to the attention of the present Legislature in order that a suitable amendment could be made permitting the legal construction of these roads. Several have been projected in Oakland and other cities; but the councils or supervisors would not grant the franchise. In both San Francisco and Oakland the mayors have vetoed electric road franchises for legal reasons.

Strange to say, the Legislature is not inclined to pass the necessary laws permitting the construction of these roads. It reconsidered a bill drawn in the interest of these roads, and amended it so that only those operated from an underground conduit or by storage battery could be permitted, thus shutting out the overhead wire system, the only one of practical value. There are as yet no practically successful underground or storage system electric roads.

This action of the Legislature has brought out many wild statements concerning electric roads, and the uninformed reader might imagine the cable and all other street-car systems doomed to give way to electricity.

A perfected storage system might excel all others, but in the light of our present knowledge of electricity as a motive power, there are still many difficulties to be overcome. The overhead system has many disadvantages. The poles are unsightly; the wires break; the damp weather affects the power, and the gearing under the car is noisy. It has still to be proven, too, that they are run any cheaper than the cable, though the first cost of construction is admittedly much less.

The cities of New York, Chicago, Cleveland, St. Louis, Detroit, Washington and Philadelphia are increasing their cable system, but not their electrical ones. The Mayor of Detroit, in his recent message, declares that the electric road is not the coming motive-power for street cars in large cities, and this, too, after trials in that place. Broadway, New York, is being equipped with a cable plant; and all the roads in Washington will soon be run by cable.

But there are plenty of overhead wire electric roads running in the United States and doing as they were intended to. For suburban roads and small cities and towns where the overhead wires are less objectionable than in finely built streets of large cities, the electric road serves its purpose well enough. There is no reason to prevent their construction except the disfigurement of the street through which they pass. But as long as telephone, electric light and telegraph wires remain on high poles in the streets, the wires for the roads should also be permitted.

It is probable that in many places the cheaply built electric roads will pay in small cities where an expensive cable road will not, and this being the case, there should be no law to prevent their construction. If the people are willing to permit the wires and poles to be put up, and the capitalists are willing to build the roads, the law is a stupid one that prohibits it. There is no denying that there are many of these roads in operation, but whether paying or not is the business of the owners. If they accommodate the public and afford means for people getting out of the crowded districts of cities, they answer their purpose. In view of what is being done elsewhere, California will be the laughing-stock of the country if its Legislature permits a law on the statute-books prohibiting the construction of overhead electric railroads.

The Bear Valley Dam.

(Continued from page 65)

construction of great dams. Probably many engineers will answer in the negative; it is easy and safe to do so, and the person so answering has the cheap satisfaction of knowing he can always insist that he is right until some one builds a dam in which the strains are greater.

"While I would hesitate to recommend the construction of its counterpart under anything less than the pressing necessity under which this was built (when there was only so much money to be had, and it was a question of dam or no dam), yet I share the opinion of Mr. Brown, the designing engineer, in believing it to be safe under all normal conditions, and in case of an earthquake, somewhat safer than a straight gravity dam with a factor of two against overturning.

"In support of this opinion I submit the following facts:

"First—and above all—the dam is there, and has stood there for seven years under every conceivable natural strain except earthquake, and as yet a close inspection shows no sign of weakness in any part. The waste weir has been dammed up and the water has been raised to a depth of 44 feet above the top of the foundation. During storms, large waves have washed over the top and fallen 60 feet to the rocks below. Ice has been formed every winter to a thickness of over three feet, with a conformation of channel above the dam that would seem designed to make the ice pressure peculiarly trying; and lastly, 14 feet of snow has lain upon the ice at one time, and yet, as far as can be judged by appearance, the dam is in as good a condition as when it was first built.

"Second—The strains are all comprehensive,



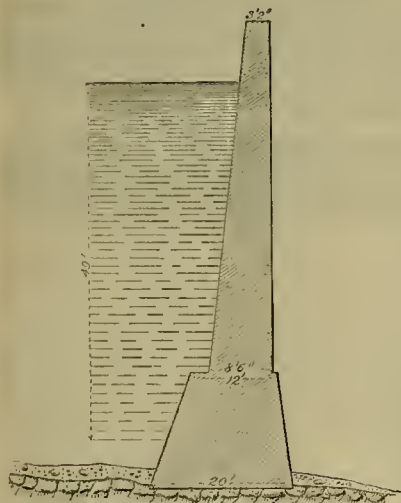
THE PROPOSED NEW BEAR VALLEY DAM.

An engraving is also given herewith showing the proposed new Bear Valley dam, to be built about 100 yards below that we have described in order to enlarge the capacity of the original reservoir. The new dam is called a 120-foot one because it will raise the level of the water to 120 feet above the old datum plane, from which all the levels in the valley were taken.

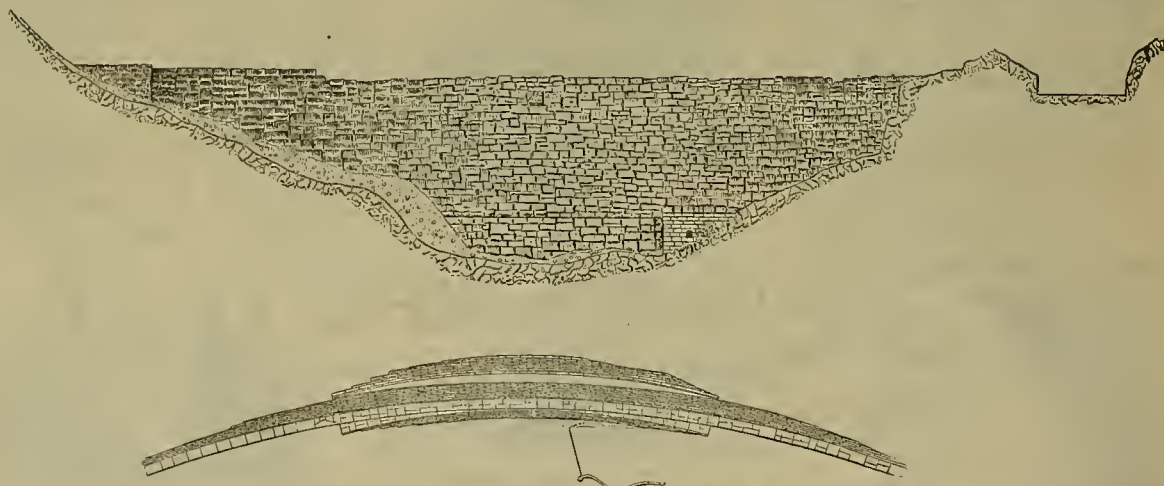
onslave of the foundation below the natural surface of the ground, will be 133 feet.

The old dam is 60 feet high from the bed-rock, and was located on the best site available for a dam of that height, but above that level the sides of the canyon are not so steep at the site of the old dam as they are a little farther down stream. Hence, it so happens that the

Corporation Limited has been organized in London, and the necessary capital has been secured. The work of railroad construction is now going on actively in every direction. A number of mining engineers have been set at work examining mining properties in different parts of Peru, and this branch of the industry is being pushed. Petroleum-fields have been dis-



CROSS SECTION OF THE DAM.



ELEVATION AND GROUND PLAN OF THE BEAR VALLEY DAM.

and, by reason of the very 'unknown internal strains,' which the engineers of the Quaker Bridge dam feared to induce by throwing their dam into the curved form, every particular cubic foot of the mass, except one immediately on the convex face, will be found to be pressed on all six faces instead of two, a condition which will greatly add to its strength. If pressed equally on all six faces, such a cube would be in the condition of rocks under great mountains, and would practically be indestructible by any pressure however great."

In the picture of the lower face of the old dam, found on another page of this paper, the water will be seen flowing over a measuring weir close to where the lower man is standing. The crest of this weir is just at the level of the datum plane, and, as the new dam will be built lower down the canyon, about 150 feet from the old one, it will start 8 feet below the datum. This will make it 128 feet from bed-rock to the water-line. Above the water-line will be a wave parapet 3 feet thick and 5 feet high; therefore the total height of the dam, ex-

posed 120-foot dam can be built on a new site a little lower down and entirely independent of the old one, and still cost probably \$75,000 less than it would if an attempt were made to utilize the old dam by making it a part of the new one on the old site.

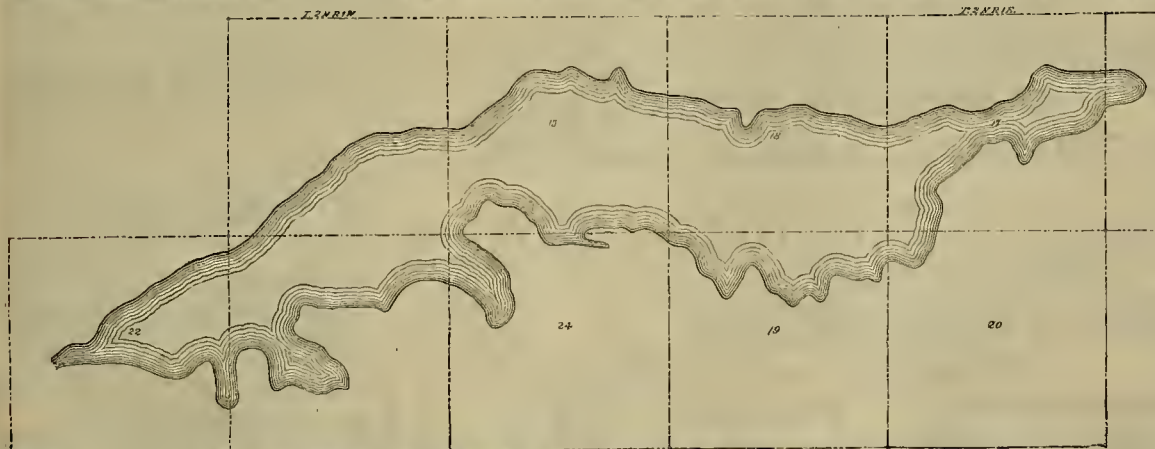
(To be Continued.)

Peruvian Mines.

Mr. W. R. Quimby of this city learns from Grace & Co. that the money has been raised to go on with the work in Peru. The Peruvian

covered and are being worked. Immigration has not yet begun, but preparations are going on in Europe to secure immigrants.

The wealth of Peru is proverbial, though of late years the country has not been very prosperous. The organization of this company to build railroads and develop mines will be a very important factor in the future of the country. There are many known mining properties in Peru that ought to pay handsomely if systematically worked by modern methods.



MAP OF BEAR VALLEY RESERVOIR, SHOWING GOVERNMENT SECTION LINES.

COAL AND IRON MINERS.—A dispatch from Pittsburg, Pa., says: The miners of the United States have just completed plans for the greatest industrial battle ever inaugurated in America. The conflict between the miners and mine-owners will take place on the first of May. The entire national organization of miners, comprising 150,000 men, will be directly involved in a demand for eight hours a day. At a convention of the American Federation of Labor, held in Detroit several weeks ago, it was decided to back the miners for eight hours a day next May. The utterances of the officers of the United Mine Workers on the subject leave no doubt that the miners will make a fight. An immense strike fund is being made ready for the miners, and when the latter go out they will have at their back for immediate use nearly \$1,000,000. This fund will be swelled from time to time at the rate of \$50,000 a week.

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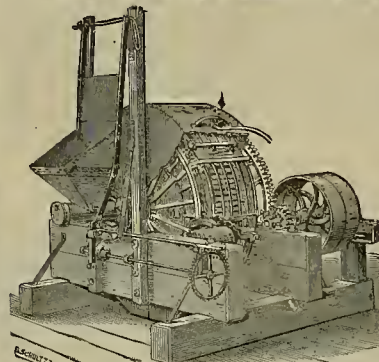
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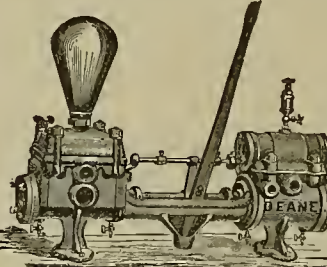
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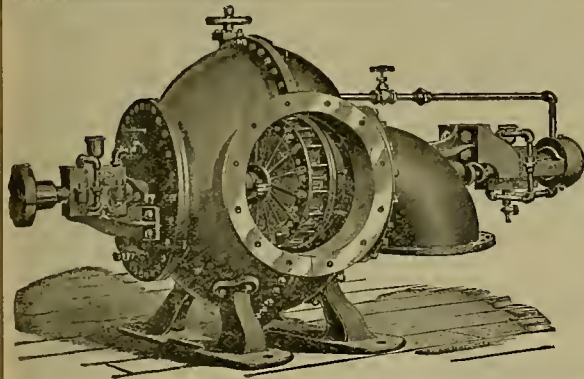
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THE GRAND BRONZE MEDAL was awarded by the 25th Industrial Exhibition of the Mechanics' Institute of this city on the Schenck Swinging Hose Reel. This reel is one of the most ingenious and perfect of recent inventions, and was made with a special view to simplicity of construction, service, durability, reliability, and perfect utilization of the water, and was made under an excellent record for itself, and has been placed in nearly all the large buildings lately erected in the West. The architects appreciate their superiority for inside fire protection, and have specified them in nearly every prominent building now being erected or in contemplation. No more perfect and reliable system of inside fire protection can be secured. W. T. Y. Schenck, 222 and 224 Market Street, San Francisco, is the inventor and manufacturer.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING JAN. 20, 1891.

445,036—CIGARETTE MACHINE—H. Bohls, S. F.
 445,133—SEPARATOR—Cook & Parsons, S. F.
 444,976—FUEL-SAVING DEVICE—M. B. Dodge, S. F.
 445,052—GATE—J. W. Fisher, Palouse, Wash.
 445,110—GAS ENGINE—M. A. Graham, S. F.
 444,936—HARVESTER—G. W. Haines, Stockton, Cal.
 445,172—GRAIN SEPARATOR FOR HARVESTERS—L. H. Hill, Oakland, Cal.
 444,912—FAUCET—Meany & Bodie, Santa Barbara, Cal.
 444,932—ENVELOPE FASTENER—C. H. Voll, S. F.
 444,991—SIGNALLING APPARATUS—Morgan & Crowley, Los Angeles, Cal.

The following brief list by telexgraph for Jan. 27, will appear more complete on receipt of mail advices:

California—Henry Albert, Crescent City, assignor of two-thirds to T. R. Hayes, of Pasadena, can-labeling machine; George F. Andrews, Riverside, extensible tree prop; Louis E. Baker, San Francisco, type-writing machine; Stephen B. Black, Pasadena, agricultural implements for irrigation; Milton Debar, San Jose, invalid's bathing appliance; John E. Foster, Ferndale, harness; William S. Gage, San Francisco, coin wrapper; Henry O. Hooper, San Francisco, reverse movement attachment for type-writing machine; Edward M. Knight, San Francisco, filter; Joseph P. Maxey, assignor of one-half to H. A. Davis and S. Wilson, Oakland, such balance; William A. Todd, San Francisco, horse-hoe; William B. Wall, M. I. Jones, Tustin, and A. D. Bishop, Orange, fumigating trees and other plants; Ruel W. Whitney, San Francisco, type writing machine; Fred W. Wood and J. Fowor, Los Angeles, guard for street railway cars. Washington—Oleo F. Fehrsom, Tacoma, folding paper bath; Nathan A. Wheeler, Alpowa, calendar.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SEPARATOR.—Austin Cook and Wm. L. Harvey, S. F., assignor of one-third to T. J. Parsons. No. 445,133. Dated Jan. 20, 1891. The invention relates to the general class of harvesting machines, and is especially adapted and intended for the separation of wild oats from cultivated oats or any other grain or material.

TRAVELING HARVESTER.—Geo. W. Haines, Stockton. No. 444,936. Dated Jan. 20, 1891. The patent covers a number of details of construction in traveling harvesters which improve and simplify the machines.

ENVELOPE FASTENER.—Chas. H. Voll, S. F., assignor of one-half to Oscar Fischer. No. 444,932. Dated Jan. 20, 1891. The object of this invention is to provide a simple and effective fastener for envelopes to be so adapted and applied that they can be by any possibility be opened without mutilation. The fastener consists of a strip of bendable metal one end of which is passed into the envelope and the other lies without it and crosses the point of the free fly, said inner end having a die integral therewith and said outer end having an integral eyelet on the same side as the die, said eyelet passing through the fly and underlying flaps of the envelope, and adapted to be flanged within the envelope by contact with the die.

GAS ENGINE.—Marcellus A. Graham, S. F. No. 445,110. Dated Jan. 20, 1891. This patent covers certain improvements in the details of construction of explosive or gas engines. To operate this engine the inventor employs an explosive gas or a vapor which is produced by mixing the proper proportion of atmospheric air with the vapor of naphtha, benzene, or other volatile hydrocarbon, and this vapor is drawn into the cylinder by a down-stroke of the piston, which acts as a pump, drawing the vapor from the source of supply through a suitable valve in the cylinder, and when the piston returns on its p-stroke the valve is closed and the vapor compressed in the upper part of the cylinder, so that when the piston commences its down-stroke again the upper part of the cylinder is charged with compressed explosive gas and this is then ignited by an electrical spark or igniter operating within the cylinder; and the explosion gives the piston such an impulse that it will complete the present stroke and the following one, in which it again acts as a pump to fill the cylinder with the explosive material, and the explosion taking place at the next stroke gives sufficient impulse to continue its motion. This regular power is properly stored and distributed by means of fly-wheels. The novel feature of the invention is the direct application of the governor stem or spindle to the main valve, admitting the vapor to the engine without the use of a supplemental valve of any kind, and by this means the inventor avoids considerable spaces and passages within which the vapor would remain between the source of supply and the engine.

FUEL-SAVING DEVICE.—Miles B. Dodge, S. F. No. 444,976. Dated Jan. 20, 1891. This is an improved apparatus to be used in connection with train engines and boiler furnaces for the purpose of economizing the fuel used under the boiler. The object of the invention is to introduce air into the furnace for the purpose of combustion at a high temperature and to utilize the exhaust steam of the engine and that waste heat from the boiler furnace accessibly for the purpose of raising the temperature of the air, at the same time employing the air-last which is thus being heated as a means for conserving the steam which exhausts from the engine.

TRAIN-FARE PUNCH.—Willis D. Eitel, San Jose. No. 444,576. Dated Jan. 13, 1891. This invention relates to a device which is called a train-fare punch,

which is adapted for the use of conductors for the purpose of indicating the amount of money received for tickets sold on the train. It consists of a casing containing a train of gearing, reciprocating racks by which the gears and connecting indicators are wound, said racks being actuated by the ticket, with gauges to limit the movement, together with certain details of construction.

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In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quicksilver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc.

He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tallies, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast.

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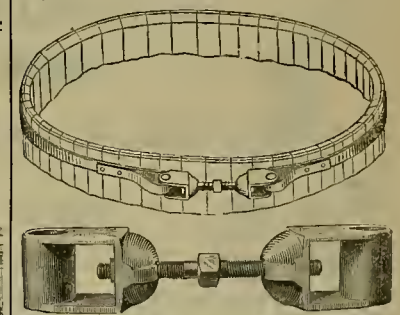
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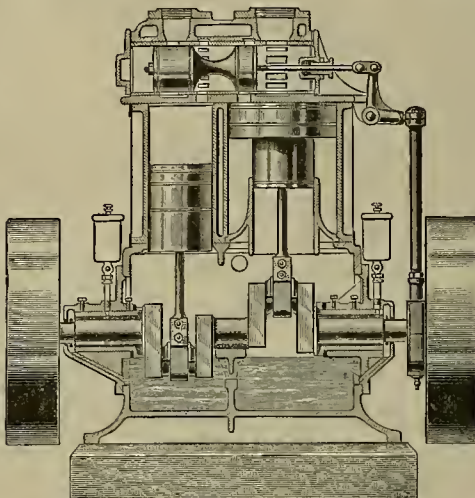
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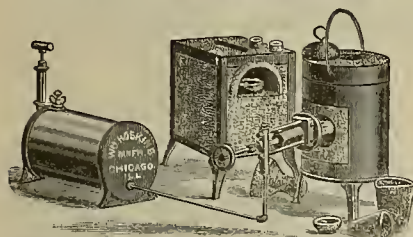
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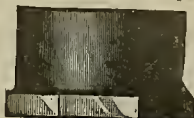
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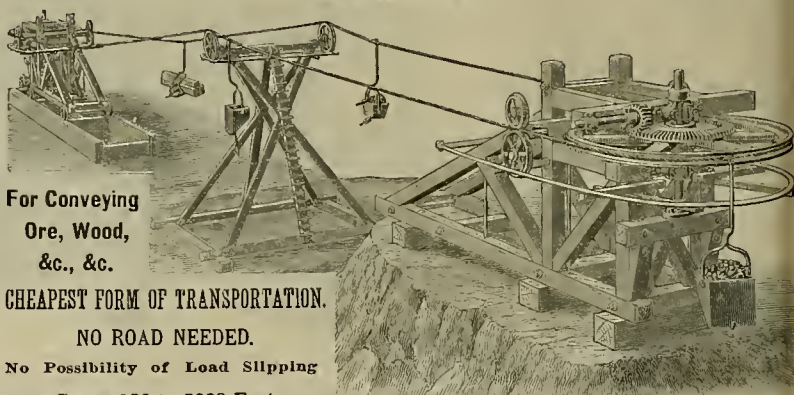
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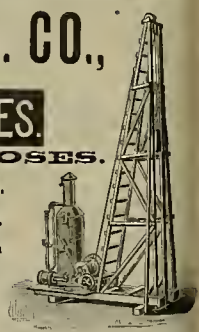
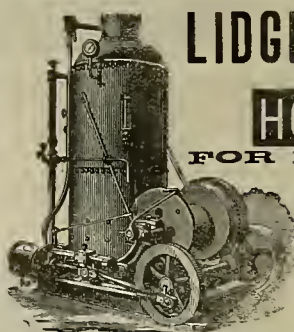
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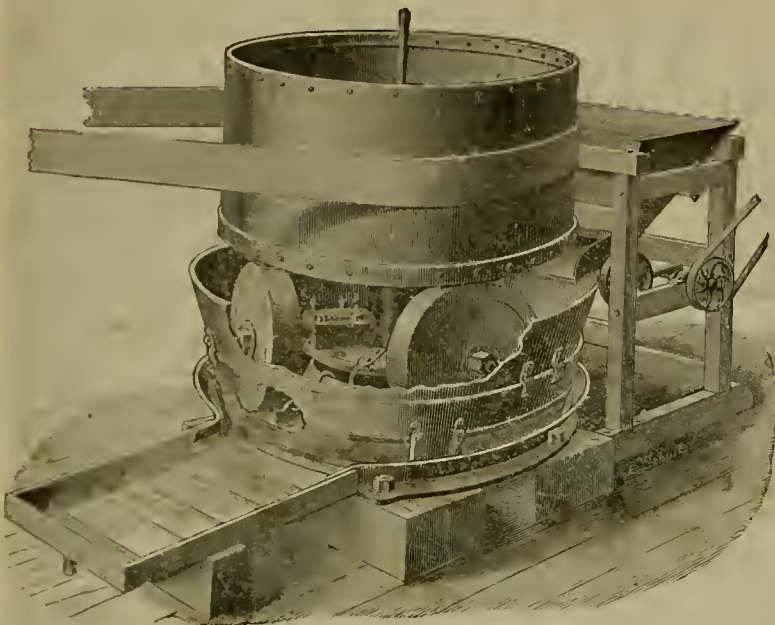
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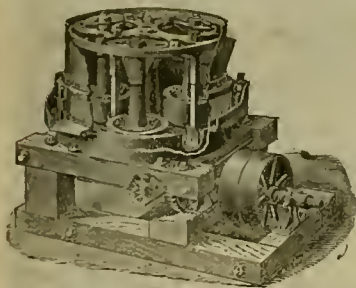
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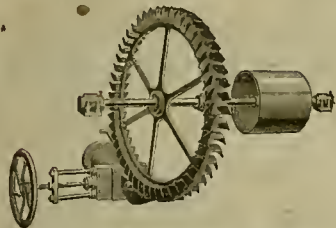
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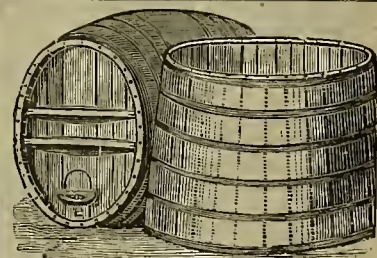
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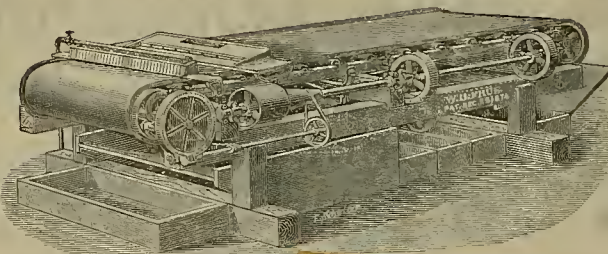
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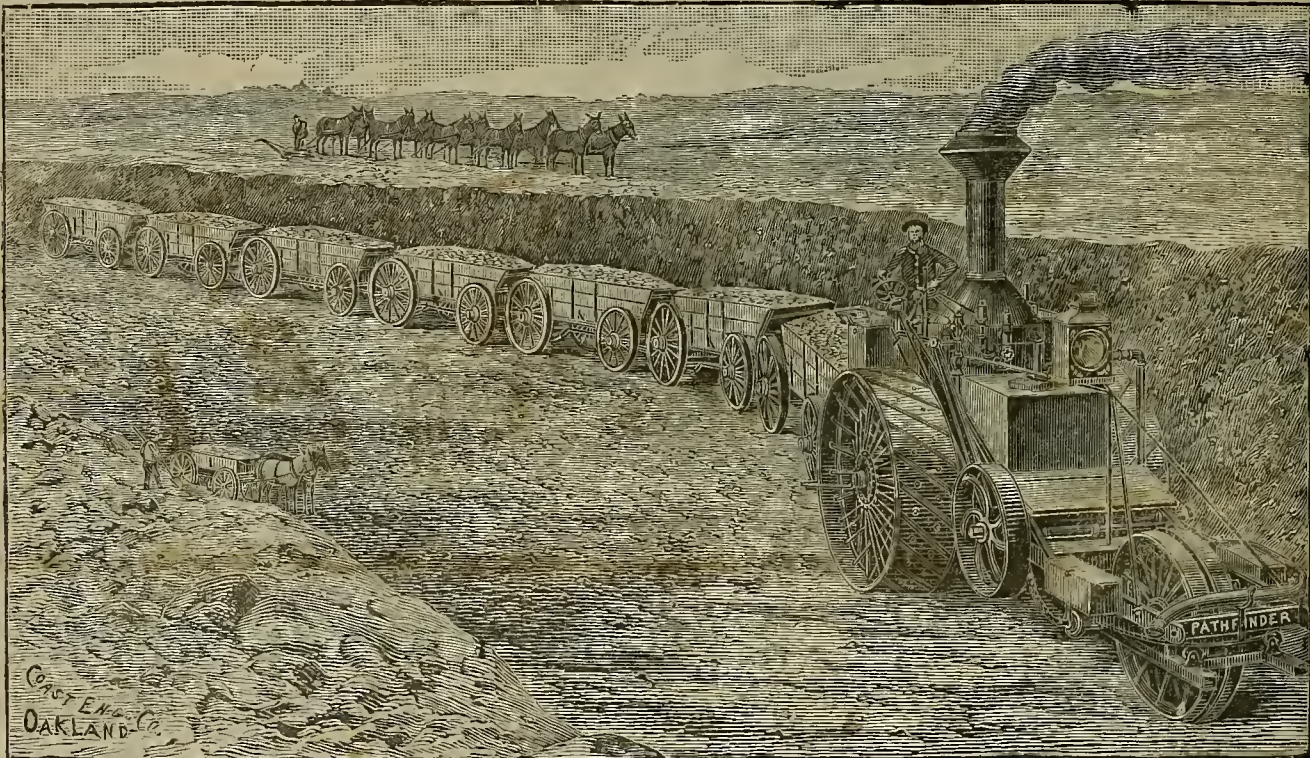
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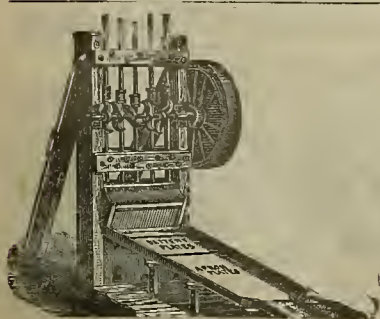
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An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXI.—Number 6
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, FEBRUARY 7, 1891.

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Crushing Fine Material.

The accompanying engraving shows a Gates ore-breaker with revolving screen and return elevator. This plant is designed to break the material very fine and to size it so it will all pass a certain mesh screen. With this plant it is practicable to break so that everything will pass a three-eighths inch screen. The great advantage of having product thus prepared for stamp-mills, rolls or other reducing machinery, is at once apparent. It is also perfectly adapted to preparing certain ores for roasting and other processes requiring an even product; for finishing material for concrete, top dressing, roofing, terra cotta, etc.

The practice in breaking material fine has heretofore been to reduce the size of the discharge opening of the breaker to the smallest opening possible without allowing the crushing surfaces to touch, then feeding the breaker only such quantities of material as will not use enough of the breaking surfaces to require power enough to stall the machine or overbeat the journals. It is well known to those familiar with stone and ore breaking that the power required and strain on the machine increase in an inverse ratio as the discharge opening is decreased. In this plant advantage has been taken of this fact, so as to produce a maximum amount of fine material with a minimum amount of power, wear, etc.

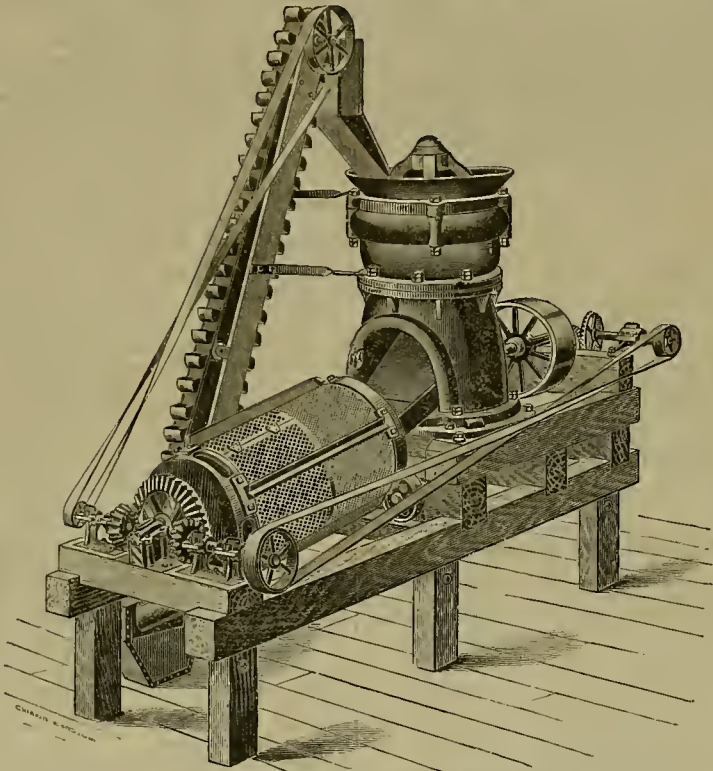
The discharge opening is large enough so that the machine works easily when the entire crushing surfaces are acting on the material. The material passes into the screen, which has perforations to take out the size required, the residue or rejections, as they are named, passing out at the end of the screen and being rapidly returned by the elevator into one of the openings of the breaker.

The new material is fed into the two remaining openings, and an occasional piece into the opening with the rejections. The amount of

rejections returning being much greater than the product which goes through the perforations in the screen, the side of the breaker into which they return is kept full, and thus they are rebroken by contact with themselves as well as with the breaking surfaces in passing through the machine again, and in time become

small enough to pass the perforations. The feeding of the new material is soon regulated to the amount of rejections returning, and the breaker is then doing all the work possible.

When desirable to stop work, the rejections will be broken down to small quantity in a few moments after feeding is discontinued. The



GATES ORE-BREAKER FOR FINE MATERIAL.

gate is then put in the upper spout and the remaining material caught in the spout. This leaves the machine free to be started, and when under full headway the gate is drawn, letting the material therein into the breaker, and the feeding commences as before.

It must be understood that the above described plant is especially recommended where a very small or even product is desired. If not smaller than $\frac{3}{8}$ inch and some spalls are not objectionable, the screen and elevator are not needed with this breaker up to and including Size 3, as the product from the breaker will be finer and more even than that obtained from any other machine. The Pelton Water Wheel Co. are agents for the Gates crushers for the Pacific Coast.

The Cruiser Baltimore.

The cruiser Baltimore is one of the class of unarmored cruisers of the "new navy" of the United States. She is 335 feet long, 48 feet 6 inches beam, 19 feet 6 inches draft and 4400 tons displacement. The propelling power of the vessel consists of two horizontal, direct-acting, triple-expansion screw engines, and boilers capable of developing 10,750 horse power when making 110 revolutions of the screws per minute. The two high-pressure cylinders are each 42 inches diameter, intermediates 60 inches, and the two low-pressure 94 inches, having a piston stroke of 42 inches. The main steam valves are double-ported slides working on hard cast-iron seats.

The screw propellers are made of manganese bronze, having three blades each 14 feet 6 inches in diameter, set to a mean pitch of 20 feet with a variable pitch of 18 feet 6 inches and 21 feet 6 inches. The starboard propeller is right-handed and the other left-handed. She has four French breech-loading guns, six six-inch breech-loading rifled guns, eight six-pounder rapid-firing guns, and two gatlings. She is also fitted with five torpedo tubes.

The Baltimore is one of the series of ships built on the English drawings, and was built by Messrs. Cramp & Sons of Philadelphia. The accompanying engraving, made direct from a photograph, shows the general appearance of the cruiser.

A LARGE body of water was suddenly liberated in a coal mine at Janesville, Pa., on Wednesday, and 18 men were drowned. The working is situated immediately under the old workings known as No. 8, worked out some five years ago and filled with water. The cause of the disaster was due to the drilling of a hole through a pillar, which liberated an immense body of water confined in the old workings, flooding the new workings and drowning all the men in that portion of the mine.

The manager of the "National Mineral Mining Co." has been convicted by a police court jury of setting up and managing a lottery, which masquerades under the title of a mining company. This was a test case. Chief Crowley says that if the scheme is discontinued no other arrests will be made, but if the managers insist on resuming business, he will cause the arrest of the whole crowd.

A COMPANY called the California is to work the Pittsburg mine, near the head of Squirrel Creek, Nevada Co. Work will be commenced shortly on the prospect.



THE UNARMORED CRUISER BALTIMORE.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Gravel in British Columbia.

The Middle Creek Gold Mines.

EDITORS PRESS:—The Middle Creek Gold Mining Co. was incorporated in Jan. 1890. Its property is situated on the first north fork of the Stickeen river in British Columbia, and consists of 1440 acres of land that is mostly gravel, in trenches from 50 to 150 feet high, in which can be found gold in every place where it has been prospected. The company has an abundant water supply at a nominal cost with fall of upward of 300 feet, and a dump below without limit. The climate is cold in winter, but hydraulicking can be carried on from April till October, the long days of 20 hours of daylight in July being especially favorable. There can be found near by plenty of fish and game. There is no debris question there to interfere with operations, and a property so situated here with regard to dump, fall, water supply, body of gravel and privilege of working would be of immense value.

The directors of the company are: Chas. P. Harris, Pres.; Cesar Bertheau, Vice-Pres.; Harry D. Hawk, Sec.; Geo. W. Peterson, Supt.; Rudolph Jordan, Martin Bacon and Chas. J. Chapman.

The following is the report of Acting Superintendent George W. Peterson to the directors of the Middle Creek Gold Mining Company:

Gentlemen:—A partial report dated Oct. 27, 1890, was submitted to you by Mark Shepard, superintendent, which omitted some items of detail which might be of interest to your stockholders and of some importance in determining future action.

Mr. Shepard was taken sick on the 5th of September and left the property in my charge; hence I beg leave to submit the following to you as a report supplemental to that made by Mr. Shepard already referred to:

We left here on the 1st of April, 1890, and arrived at Fort Wrangle on the 25th. We were delayed here awaiting transportation until May 22d, on which day we started by the Stickeen river on the steamer Alaskan, expecting to arrive at head of navigation in five days, instead of which we were 15 days, owing to low stage of water, thereby losing ten days of valuable time.

At Telegraph Station we were also delayed several days awaiting arrival of pack-train, during which time we built a trail nearly 12 miles so as to transport our supplies. On the arrival of such pack-train from Deese lake, and the completion of the trail, our supplies were put on the company's ground as rapidly as possible. It being June 11th before we arrived at our destination, we found the country had been in such condition that we could have worked at least six weeks before had we been on the ground, as vegetation was rank and flowers in full bloom.

We at once surveyed a ditch, built a camp, and began active work, as shown by report of Superintendent Shepard.

After expending several days in surveying our ditch, all our work was obliterated by a forest fire, which destroyed all the marks and pegs, also making a loss of time in resurveying. After the above delay aggregating a loss of 33 days, all matters connected with the working of the claim ran as smoothly as we could wish, with exception of our ditch break, of which hereafter.

The digging of our ditch and fitting the pipe and other attendant necessary preparations, fully occupied all our time until August 24th, when we first let the water through the ditch and began washing. After piping five days (days and nights) a break occurred in the hill, carrying away 150 feet of our ditch, including our penstock at the pipe head, which necessitated a change of ditch penstock, pipe line and general workings, making a delay of 14 days.

The landslide was caused by percolation from the ditch which extended downward, softening the whole hillside at that point for hundreds of feet. On the beginning again of our washing, we found many howlers in the gravel too heavy and too large to handle without powder or derrick, and as we had neither, we found ourselves at great disadvantage.

We found also that if we continued washing for a few days longer, no cleanup could be made on account of howlers and inability to get to bedrock in so short a time, hence I decided to spend the few remaining days in preparation for another year, and in prospecting our ground that I might be able to state the probabilities for future guidance from personal experience. At that time we were short-handed and found it difficult to get men, as the distance from Fort Wrangle, 200 miles, was too great. We had also to prepare winter quarters for the men who will winter on the company's property. On the date of my leaving the claim, Oct. 10th, the property was in charge of three men who had ample provisions on hand to last until next June, and who will begin working as early as possible, at least 40 days before your superintendent can get there from here.

As acting superintendent and a stockholder, having quite an interest at stake, I prospected the company's property and examined into the water rights and supply thoroughly and conscientiously, and it gives me satisfaction to be

able to report the results. I found our title to be undisputed and beyond question, that such water is at least 2000 inches at lowest stage and continues the entire season. I found plenty of timber on our ground for all purposes. On prospecting I found gold in every pan from the top of our cuts to the bedrock, in some instances such prospects being exceedingly favorable, and all being most satisfactory and promising to hydraulic miners. In the spring coming we will begin working in a hillside where we will soon have a face or bank of gravel at least 100 feet high, which height increases as we advance.

The gravel at this place prospects exceedingly well, and with a run of a season there is not the slightest doubt of the company paying a dividend.

The amount of gravel in sight on the claim cannot be washed away in many (say 50) years in seasons of six months each, by any known process with our water supply. In regard to the past season, taking into consideration the loss of time as before mentioned, the fire, the distance and all inconveniences attending the equipping and opening of a mine situated in an unopened country 2000 miles or more away, we could hardly in reason have expected a dividend the first year, or that the property could have been put on a paying basis. Yet I am confident that had I been able to get a run of 40 days, I could have cleaned up more than enough to have returned to the company all its expenditures. After an experience of several months on the premises, I feel that the Middle Creek G. M. Co. can be congratulated on having a very valuable mining property.

Oro Blanco District, Arizona.

EDITORS PRESS:—I very seldom see anything in the papers about this portion of Arizona, which is, however, certainly coming to the front as a hulk-producing section.

For the last seven or eight years this portion of Pima county has had a black eye given to it by a number of old "chromes" who do their prospecting in their cabins and denounce all properties outside of their own locations, which generally prove themselves of a wild-cat character when submitted to a proper examination.

Up to within the last two years a very small amount of prospecting has been done, and to those who have ventured to-day belongs the honor of bringing Oro Blanco district at least to the front. The Yellow Jacket mine, which has been idle for the last 12 years, and which was sold some time ago to a New York party, has now in full operation a new 20-stamp Boss process mill, which is kept running day and night.

The main shaft is now down 250 feet and crosscuts from wall to wall show a ledge of from 40 to 60 feet, nearly all of which is pay ore for the new mill. The drifts show up finer ore in all parts of the mine than was ever expected by the former owners.

Are there any more claims or mines on this lode or mineral-bearing belt? Well, I should remark! This mineral belt is traceable along the entire for seven or eight miles, and in a number of different locations can be found immense deposits of higher-grade ores than are mined by the Yellow Jacket Co.

Space will not permit me to describe the various claims on this lode outside of the Yellow Jacket mine, but I shall in my next letter describe to your readers mineral-bearing properties on this lode that will, no doubt, attract the attention of capitalists looking daily for a good chance to successfully invest their money.

There are now pending several mining sales on this lode, which, if consummated, will prove to the "Chronicle Kicker" of Oro Blanco mining district that he better be placed in a crematory alive than to try to again denounce the only resource of this country from which comes his fripples and carne seco. I. C. U.

Yellow Jacket Camp Oro Blanco, Pima Co., Arizona

MINING IN THE FUTURE.—When there occur a few failures in mining operations, the faint-hearted at once commence to decry the industry and to predict its final abandonment in the section in which they live. It has been so in Nevada county several times. But only a few years elapse before a revival sets in, and the former croakers become more enthusiastic than the ones who succeeded in opening good properties. The principal industry in mining counties has been, is now, and will continue to be, mining for a century to come. While agriculture and horticulture will be carried on to some extent, and profitably, too, the main reliance will be mining. There are possibilities not dreamed of yet all over the foothill counties. Mining makes a market for the farmers and gives business to the towns. It produces a circulating medium that the world needs and must have. It makes a section of the State prosperous that would otherwise be very thinly populated. It gives patronage to iron-workers, transportation companies, mechanics, and in fact to all lines of business. Hence it should be encouraged by all citizens. Officials, high and low, should favor it, and legislative bodies should listen to its demands. A district should be set apart so mining can have a Congressman to represent it in the National Legislature. We hope to see the present Legislature so apportion the State that this desideratum may be reached.

—Nevada Herald.

Mines and Mineral Deposits on the "Eastern Slope."

Baece Oree, Auriferous Gravels, Etc.

EDITORS PRESS:—Along the easterly slope of the Sierra Nevada, extending from the headwaters of Walker river on the north to the headwaters of Owens river on the south, a distance of 60 miles, valuable mineral deposits occur almost continuously. These deposits are of various kinds, including small gold-bearing veins and mixed gold and silver-bearing lodes, some of them of great magnitude, besides a large area of placer ground. This metalliferous belt was run over and hastily prospected soon after the discovery of the Comstock lode, numerous mining claims having at that time been taken up along it. Slight examination disclosing that the ores here did not belong to the Comstock school, the type the prospectors were then in quest of, a majority of the claims taken up were soon after abandoned, the most of them before anything had been done upon them.

On a few of the more promising, however, exploratory work was commenced, this work on several having afterward been prosecuted to definite results. Among these,

The Dunderberg Mine.

Located in the Jordan or Castle Peak District, stands conspicuous, the ledge here having been opened up by a tunnel nearly 600 feet in length. This ledge, which traverses the mountain-side in a northerly and southerly direction, can be traced by its outcrop for a distance of several miles. The strength of this lode and the regularity with which it holds to its course, together with the character of its contents and of the enclosing formations, establish that it occupies a true fissure. It occurs between walls of slate and porphyry, standing from 60 to 100 feet apart, the gangue matter consisting mainly of quartz, quartzite, talcose slate, and porphyry.

The tunnel, run in from the east, intersects the footwall of the lode at a depth of 355 feet below the outcroppings, the lode at this point pitching to the west at an angle of about 75 degrees. From the tunnel a drift has been extended north 200 feet and another south 100 feet. These drifts, carried in along the footwall, disclose here a streak of highly sulphurated quartz from three to ten feet in thickness.

From the report of Mr. Henry Griswold, an experienced and competent miner, who had charge of this property for some time, the following facts in regard to it are derived: In the north drift mentioned, an ore chimney nearly 100 feet in length has been developed. The ore extracted from this chimney daily, for a period of six months, showed an average value in gold and silver of \$55.86 per ton of 2000 pounds. Samples of the highly sulphurated ore taken from 40 different points above the present levels yielded an average of \$64.28 gold and \$53.42 silver per ton, the quantity of this class of ore developed in the mine being estimated at 12,900 tons, exclusive of much lower-grade milling ore.

The reason assigned for discontinuing operations here is the want at that time of a process adapted to the successful treatment of this class of ore, the most of which, though rich in the precious metals, is extremely base, these metals being combined with arsenic, iron, sulphur, antimony, etc. With the improved metallurgical methods since introduced, it is believed this ore could be successfully and profitably worked, it being under this conviction that parties having ample means are about taking hold of this mine with a view to developing it more fully and working the ore on a large scale, for both which there exist here the best facilities. The ledge can be exploited to great depths by means of adits driven in from the easterly face of the mountain, wood of the best quality, whether for lumber or fuel, also water, being abundant on the ground. This entire slope of the Sierra is in fact well timbered, streams of water, large and small, coursing down its side at short intervals. In this respect no mining district in the State is better situated.

Nor is the Dunderberg the only promising mine along this belt. There are others equally promising and perhaps equally valuable, this property having been here more fully described, simply because more and better work has been done upon it than on any other. Whether or not there is enough in this region to justify many and large investments of capital, certain it is there is enough to invite careful examination on the part of those contemplating ventures in that direction.

The Placer Ground

Mentioned consists mainly of heavy deposits of auriferous gravel, adapted to be worked only by the hydraulic process, most of the shallow diggings, ravines and gulches having been worked out by hand-sluing and rocker-washing long ago. The conditions for hydraulic gravel-washing are here of the best kind, both gravel and water being plentiful, the latter capable of being applied under any desired head, with everywhere ample fall for running off tailings. A great deal of this placer ground has been taken up and is now held in large tracts by companies, some of which contemplate outfitting their claims with plant and inaugurating here large hydraulic operations the coming spring, and it is not improbable that the lower slopes and foothills of the Sierra at this point will eventually become the sites of numerous other enterprises of this kind.

Jan. 25, 1891.

HENRY DEGROOT.

Gravel Mining in Plumas.

An Undeveloped Industry.

A correspondent of the *Plumas National* writes as follows:

Gravel mining in this county is comparatively an undeveloped industry. It is true that gravel has been washed since the earliest days, but when the vast group of ancient river beds, a majority of which are still undisturbed, is considered, it is at once apparent that this special branch of mining is as yet scarce begun.

Gravel mining in the early days was confined exclusively to shallow banks, river here, and the still lighter deposits in the creeks and gulches, composed the bulk of mining operations in those days. The facilities and present modes were unknown. But as time progressed and the shallow "diggings" became exhausted, the necessity of opening deeper mines presented itself. Appliances of a suitable character were invented, and the hydraulic pipes were brought into use. This mode of mining, however, could be applied only on channels that were situated sufficiently low to allow of water being brought in ditches higher up, thus affording fall, or pressure, to the water conveyed through pipes from the ditches and reservoirs into the mine. Channels thus favorably situated were not over-plentiful, yet the industry developed into great prominence and contributed largely to the gold yield for many years. It is not, however, of this kind of mining that I would speak in this article, but of the existing untouched and undeveloped river channels that lie higher up and beyond the availability of working by the hydraulic process. And even were they less unfavorably situated, a majority of them could not be profitably mined by this mode, owing to the lava caps that cover them and the heavy deposits of pipeclay that overlie the deposits of gold-bearing gravel. This gravel being the heavier material, underlies all other deposits and is contained entirely within and directly on the bottom of the channel.

The age, or possibly the different ages, in which these channels were formed, is conjecture, and in the writer's opinion, it is needless for practical purposes to spend time in computing or theorizing on the ages or epochs to which they belong. This is for the scientist, whose occupation is so confined. For the practical miner, or the capitalist, who may invest a portion of his wealth in opening these channels, it is sufficient to know that they exist, and when developed, the investment will yield a hundred fold. The only practicable way to open these rock-rimmed mines is by running tunnels through the rims, at a sufficient depth to tap the bottom of the channel, and then get at the gravel deposits. This once accomplished, the rest is easy. Through this mode the upper strata of clay and lava, which are barren of gold, are left unmolested, while the gravel is "breasted" out.

It occurs to me at this point that the immense bodies of clay may contain vast quantities of that rare metal, aluminum. Should it be proven that this clay contains this mineral—and we read that it is found in all clays—what an immense industry would spring up. The cost of obtaining the clay would be very slight. Investigation might prove of great value. Aside from the clay deposits, the underlying gravel would yield most satisfactory returns, while the two in conjunction would form the greatest and richest mine of which man could possibly conceive. As yet, the possibility of developing such a mine is uninvestigated. Capital and scientific research would, in all probability, discover just the kind of mine mentioned. This clay is in a perfectly pure state, and in quantities unlimited. In this particular section, water for motive-power is not only plentiful but available.

The old channel system is an extensive one. Within a radius of half a dozen miles twice as many clearly defined channels are found. A few are intact for many miles in extent; others are more or less broken from convulsions and erosions. Those lying low have been worked extensively by hydraulicking and have yielded vast amounts of gold. The larger and more extensive channels, which are generally situated on the higher elevations, ridges and divides, seem the more favored locations, and being higher than the surrounding country, and with precipitous sides, afford excellent sites for tunnels. It seems to the observing mind strange that with all the natural advantages at hand that man could reasonably wish, these river-beds have not long since been explored, but such is the case, and no one, not even the fossilized miner with whom this country is hounded, can say there are no mines in these channels, for as yet, with few exceptions, nature's constructions are unmarred by man. A few attempts have been made by so-called large companies to open mines in this section, but with disastrous result. These companies were formed in the East, of Eastern capitalists, headed by adventurers with far more cheek than practical knowledge. A corps of officers was also sent from the East, whose combined knowledge of mines, when elms down, would not equal that of a Chinaman, and the number of officers sometimes outnumbered the working men. Thus the money was squandered, while development work was a secondary consideration. It requires only a limited number of men to run a tunnel—six at the most when three shifts are run—with a practical miner as foreman. If the money that has been thrown away by adventurous persons and that paid to high-salaried officers had been

judiciously spent, many paying mines would be in operation here to-day. The advent of such a company in a mining section is generally hailed with delight by the people, because times are made better, but it were far better for the section if such companies had stayed away, for when the reaction comes, as it invariably does, times are left in far worse condition than before; besides, the country gets what is technically called a "black eye," a setback from which it takes a long time to recover.

Quite a number of enterprising companies are at present engaged in running tunnels for drift mines, and with very flattering prospects ahead. By the 1st of March next this section will be awakened to the fact that such mines truly exist here, and the awakening will be the beginning of lively times, which will be permanent. A great deal of attention is just now directed to this section. The surface diggings have yielded many millions. The sources from which sprang this yield is now being considered, hunted for and found.

Butte's Mineral Record.

A most complete resume of mining operations in Butte during the year past appears in the *Miner*. The appended summary gives a clear idea of the magnitude of the industry in the great camp:

Value of the Total Output.

The following figures show the total value of the copper, silver and gold produced from the mines of Butte alone during the year:

Anaconda.....	\$15,940,000
Boston and Montana.....	3,235,000
Butte and Boston.....	1,584,000
Allice.....	1,100,000
Parrot.....	1,470,000
Colorado and Montana.....	1,250,000
Butte Reduction.....	1,600,000
Bannister.....	200,000
Moulton, Lexington and Blue Bird bullion shipped by express.....	1,600,000
Total.....	\$27,279,000

Dividends Paid.

From this output of \$27,279,000, dividends have been paid by the several companies aggregating \$6,176,000, divided as follows:

Anaconda.....	\$3,840,000
Boston and Montana.....	812,500
Butte and Boston.....	300,000
Parrot.....	400,000
Butte Reduction.....	400,000
Colorado and Montana.....	400,000
Allice.....	100,000
Moulton.....	50,000
Bannister.....	24,000
Blue Bird (three months' run).....	50,000
Total.....	\$6,176,000

Number of Men Employed.

The number of men employed and the companies employing them is accurately given in this statement:

Anaconda.....	1,500
Boston and Montana.....	500
Butte and Boston.....	350
Parrot.....	200
Blue Bird.....	300
Allice.....	300
Colorado and Montana.....	325
Lexington.....	250
Butte Reduction Works.....	150
Moulton.....	100
Glossary.....	50
Bannister.....	20
Leggett.....	20
Germania.....	20
Goldsmith.....	20
Minnie Healey.....	10
Volunteer.....	10
Valley.....	10
Mary Ann.....	10
Clear City.....	12
Homestead.....	15
Shonbar.....	10
Betsy Dahl.....	8
Others combined.....	350
Total.....	4,757

Underground Workers at Butte.

The Butte (Montana) *Inter-Mountain* says: Few people have an adequate idea of the army of men daily engaged in the mines of Butte. In order to furnish what may serve as a basis from which to figure in this important computation, the following figures are given. Only a few of the more important mines are named, but they will suffice to show in a measure the multitude of the men who are contributing to the upbuilding of Butte:

MINES.	NO. MEN.	WIFE.	NO. MEN.
Anaconda.....	400	Moulton.....	12
St. Lawrence.....	250	Kiesing Star.....	30
Mountain View.....	50	Glenary.....	60
Mountain Con.....	400	North Star.....	12
East Colusa.....	70	Blue Wing.....	40
West Colusa.....	40	Lexington.....	90
Lewisohn new shaft.....	40	Leasing Walkerville.....	150
Cambetta.....	40	Gagdon.....	100
Silver Bow.....	120	Original.....	24
Harris & Lloyd.....	100	Opbir.....	15
Ramsdell Parrot.....	50	Shonbar.....	20
Shakespeare Parrot.....	0	Vulcan.....	60
Brickerlease.....	50	May Ann.....	14
Parrot new shaft.....	120	Star West.....	12
Clear City.....	12	Nettie.....	130
High Ore.....	15	Leasers, Burlington.....	70
Modoc.....	15	The Sullivan in Park.....	10
Jim.....	4	you.....	10
Green Mountain.....	30	Clinton.....	20
East Gray Rock.....	70	Mulville's lease in Colum.....	10
West Gray Rock.....	12	his Garden.....	9
Belle of Butte.....	40	Tom Haney.....	20
Black Rock.....	35	Burlington.....	10
Daniel Quip.....	15	Blue Bird.....	90
Moore.....	50	Lille Darling.....	6
Magna Charta.....	100	Champion and vicinity.....	70
Allice.....	150		

THE NUMBER OF TELEPHONES now under rental by the Bell Telephone Co. is 478,725, an increase of 38,885 over the same time last year.

A State Weather Service.

We believe no subject now before the Legislature will command itself more forcibly to the agricultural producers of this State than the establishment of a State Weather Service upon the plan embodied in a bill introduced in the Assembly by Mr. Robertson of Siskiyou. We have really made great progress during recent years in an understanding of our peculiar climates, thanks to the Signal Service officers and other earnest students of local meteorology, and it is now feasible to greatly extend such observations and render their results more available at an exceedingly low cost. We believe there is no proposition now before the Legislature by which so much can be realized at so small cost.

The proposition is to organize and equip a State Weather Service, and, as might be expected, Serg't Barwick, of Sacramento, is leading in the effort and ready to assume its extra responsibilities and duties without cost to the State. Secretary Smith, of the State Board of Agriculture, is ready to assume the direction of the service, in addition to duties already covered by his salary. The result is, that the service can be had for the pay of a clerk and the cost of necessary stationery—each of these items being placed at \$100 per month—and the cost of instruments, which are furnished to voluntary observers, taking from them personal bonds therefor. Thus the service can be realized for very small expenditure of public money, and is in fact what is called, a "Voluntary Weather Service." Such a service is rendered practicable, because the United States Signal Service co-operates with the State organizations and furnishes blanks, postage, instruction-books, etc., free of cost to the State.

California is late in organizing such a service, and yet we know that Lieut. Finley is right when he says: "No other State in the Union is more in need of a formal organization for meteorological work than is California. She has immense interests to be benefited by the work of such a service." New York began in April, 1889, and has published a report of 122 pages deeply interesting and important, and the whole cost of the service which is thus epitomized was but \$1737.34. Other States that have established local Weather Bureaus are Alabama, Arkansas, Colorado, Dakota, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, New Jersey, Nevada, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee and Texas. By the bill of Mr. Robertson it is now proposed to extend the roster by adding California. The bill provides that the service shall be supervised by the Director of the State Agricultural Society. The central station to be at Sacramento, with a chief, an assistant and a sub-director, the first to be the secretary of the State Agricultural Society, the second an officer of the National service who may be detailed for that purpose, and the third to be the Superintendent of Public Instruction.

There are to be three volunteer stations in each county, and all teachers in public schools, if required by the county superintendents, who are to be county sub-directors, are to make and note daily observations and forward them. A weekly weather and crop bulletin is to be issued from the State printing office, from April to October, and each month a weather and crop review published, and annually the chief director is to publish, with the report of the State Agricultural Society, a review of the year's work.

This is in outline the proposition which is now before our Legislature, and one the enactment of which we believe our agriculturists should insist upon. Last summer, Serg't Barwick began a voluntary service, securing his local observers in part through invitation published in the *RURAL* and other journals. He succeeded so well that he received special commendation from Gen. Greely, Chief of the U. S. Signal Service, who has instructed Serg't Barwick to make requisition for as much extra supplies, such as blank forms, franked envelopes, etc., as may be needed for an increase in the weekly crop service for the coming season. Serg't Barwick is now waiting before making such requisition for supplies until he knows the outcome of the bill, now before our Legislature, for if this bill becomes a law, he will require much greater supplies than he could possibly use otherwise.

We have, then, the opportunity to enjoy more than ever before the benefits of the U. S. Service; we have a chance to produce a crop of trained weather observers and meteorological students; to bring the subject right into the schools, where it belongs; to inform ourselves upon crop prospects and to be warned of threatening weather conditions; to make better known throughout the world our glorious climate—all for a sum which is merely nominal in comparison with the benefits to be derived.

We can hardly see how a legislator can have a doubt upon the wisdom of the proposed legislation, and we expect to see it speedily realized.

THE HEADQUARTERS of the Mountain Division and of the Utah division of the Union Pacific will move to Ogden from Salt Lake City this month, as General Superintendent Bancroft feels it for the road's best interest for the headquarters of the road to be located where two of its divisions—the Central Pacific and Rio Grande—have a common terminal.

Magnesia Coverings.

The great need of economy in manufacture of every kind and in the employment of steam-power for whatever purpose has been one of the problems which engineers have studied ever since the introduction of steam as a motive-power. One of the greatest sources of leakage and loss of heat, and hence of waste, is evaporation. Wherever a steam pipe is exposed to the atmosphere, it at once gives up its heat, and wherever cool surfaces are exposed they absorb heat. It has, therefore, been one of the problems of the age to invent a material which should be a perfect non-conductor and which should withstand excessive heat or extreme cold without becoming itself a transmitter of either, or yet suffering under one condition or the other.

As may be supposed, many such substances have been tried with more or less success. One of the most prominent is the magnesia sectional covering which is recommended by the Bureau of Steam Engineering in the Navy Department, Prof. John M. Ordway in his report to the Boston Manufacturers' Mutual Fire Insurance Company, and thousands of other steam-users in this country. This light, cleanly and reliable material is the result of an intimate combination of asbestos, carbonate of magnesia and fiber. It is made in regular lengths for pipes and in sectional blocks for boiler covering, while specially molded pieces are prepared for all standard sizes of elbows, pipe joints, valve-boxes and other machine parts. It is readily attached to any steam pipe, being for this purpose made in lengths of about three feet each, canvas covered and supplied with two iron straps or bands for firmly holding the sections together. For boilers the blocks are made in sizes 3x18 and 6x36 inches, varying in thickness from 1 to 1½ inches. The blocks can be fitted at any time, whether the boiler is hot or cold, and when required the covering is supplied in a plastic condition, so that it can be put on with a trowel. The special advantages of magnesia sectional covering may be summed up as follows: Ease of application or removal, inflexibility, absolutely non-conducting properties, and so a matchless covering for a steam boiler or a refrigerator; durability—it will last 20 years without being touched or becoming impaired—and its power of absorption, locating immediately any leak in the pipe or other covered vessel. The sole agents of the magnesia coverings for the Pacific Coast are C. B. Johnson & Co. of 59 Clay street, San Francisco. A large stock of the material is always kept on hand. There are hundreds of places in the city where the coverings are in use, which testify better than any number of written testimonials could do to the services rendered and to the great economy resulting from their use.

Rock-Breakers and Crushers for Australia.

Parke & Lacy Company of this city shipped on the steamer "Monowal," which sailed Thursday for Australia, four No. 6 Gates crushers, each having a capacity of 1440 tons per day, or an aggregate capacity of 5760 tons per day. These breakers are made by the Gates Iron Works of Chicago, for which Parke & Lacy Co. is agent, and they are for use at the quarries of the New South Wales Government. The same steamer also took four smaller breakers of the same make having a total capacity of 2000 tons per day. These are to be used by the Broken Hill Proprietary Co., which operates probably the largest lead-silver mine or mine in the world to-day.

In addition to the above, Parke & Lacy Co. shipped three Dodge rock-breakers for other mining enterprises, having an aggregate capacity of 900 tons per day, making in all a shipment of 11 rock-breakers capable of crushing 8660 tons and weighing, ready for shipment, 135 tons.

These orders have been the result of many years of hard work on the part of Parke & Lacy Co., being virtually a question of superiority of American manufacture over those of foreign countries, and it is certainly gratifying to all to note the triumph of the former. Parke & Lacy Co. received a cable last week from their branch house in Sydney ordering four more No. 6 Gates crushers, presumably for the Broken Hill Proprietary Co. These will be shipped by sailing vessel from New York early in February.

LOWER CALIFORNIA MINING.—The San Domingo mine, owned by Americans, is situated only a short distance back in the interior and at present is furnishing work for 30 men, mostly Mexicans. In the last month, Capt. O'Connell has brought over to Cedre Island two outfits of bullion amounting to \$9600. At San Domingo the mining company is running at present only a five-stamp mill, although a ten-stamp mill is about ready for use on the ground. Forty miles back in the interior are the San Miguel arcetes, owned also by Americans, whose headquarters are in New York.—*San Diego Sun*.

THE SMELTERS of Colorado have formed a combine against the ore-producers of that State, and have them at their mercy. This has been done in retaliation for the enforcement of the lead tariff law which prohibits the importation of Mexican ore. The ore-producers are now considering the advisability of erecting smelters of their own.

Forms of Atmospheric Disturbance.

NUMBER 1.

EDITORS PRESS:—In view of the many inquiries received at this office relative to the use and significance of technical meteorological terms, and for information as to the character of the various forms of atmospheric disturbances recognized by the science of meteorology, it has been deemed advisable to prepare for publication, through the PRESS, a series of circulars or bulletins which will briefly but yet comprehensively furnish the desired data. It is believed that this plan will serve to instruct the public on an important subject and assist in making the daily weather forecast of more practical value. The first circular will treat of

The Cyclone.

About 50 years ago Piddington of Calcutta, East India, first applied the term cyclone to all circular storms of whatever area. The earliest published account of storms where the curving of the wind is recognized was by Captain Longford in 1693, in a paper on the West India hurricanes, which he called "whirlwinds." The term cyclone comes from the Greek cyclos, which signifies, among other things, the coil of a snake. Its application to the most important of all meteorological disturbances is not intended to affirm that the area described by the storm is a true circle, but rather expressing sufficiently the tendency of the air to a circular motion. The word is now accepted by the leading meteorologists of the world as properly designating a certain class of storms. The cyclone is a broad disturbance having a diameter of from 300 to 500 miles, and sometimes 1000 miles. It is a vast eddy in the atmosphere and moves along in that medium very much as the eddies in a stream of water. The air does not have an actual circular motion at any place within the storm area, but only a tendency to spiral movement.

But even this tendency is not revealed by reports from a single station. It is necessary to obtain observations from the entire area of disturbance, which, when plotted on a chart, discloses the general movement of the air gradually inward toward the center, where it rises to the upper cloud region and flows outward on all sides. This motion of the air gives rise to westerly winds south of the cyclonic center, southerly winds on the east, easterly winds on the north, and northerly winds on the west. At the center of the area there is a calm space 10 or 15 miles in diameter, known as the "eye of the storm." This is a very dangerous part of the cyclone for vessels to encounter, as they become motionless and are then suddenly caught at a disadvantage by the rear of the storm. The barometer is lowest at the center and increases outward to the circumference. The form of the cyclonic area is either circular or elliptical, generally the latter. The direction of progressive movement is from west to east under the influence of the rotation of the earth, and while not directly visible is apparent in the passing changes of the weather. The rate of movement is on the average about 30 miles per hour, being most rapid in winter, with a maximum of 50 miles, and least rapid in summer, with a minimum of about ten miles. The four quadrants of a cyclone have distinct and invariable characteristics as follows: In the northeast quadrant, great humidity, high winds, precipitation, and heavy clouds, especially in the southern portion. In the southeast quadrant, the maximum of heat and moisture, the region of all classes of local storms, especially the tornado. In the southwest quadrant, clearing weather, with dashes of rain in the eastern portion, falling temperature and diminishing humidity. In the northwest quadrant, the minimum of heat and moisture, general absence of clouds and brisk, cold winds. Some cyclones may preserve their identity in passing entirely around the earth, but the generality only make about one-third of that distance and then disappear in the general circulation of the atmosphere.

JOHN P. FINLEY,
Lieutenant U. S. Signal Corps, in charge.

DEEP COMSTOCK MINING.—As a result of the frequent meetings between J. W. Mackay, J. L. Flood, Alvinza Hayward, W. S. Hobart, S. L. Jones and others, who control the north and middle groups of Comstock mines, deep mining is to be resumed along the entire lode, after a lapse of five years. The pumping operations in the Crown Point incline are slowly reducing the water in the Gold Hill and south-end mine, and it is only a question of time before mining will be resumed in the lower levels of these mines. The decision which culminated on Tuesday in an agreement to the effect that deep mining will be resumed in the middle and north-end mines, completes the general plan. The initial step to be taken will be the placing of Cornish pumps in the combination shaft, to pump out the water until the hydraulic pumps can be recovered and set to work. Later, the pumps at the C. and C. shaft will be started. A plan has been arranged for the drainage of the entire lode, and it will be carried out with all necessary despatch. The action thus decided upon will tend to encourage those who believe that in the lower levels there are reserves of ore yet to be uncovered which may equal in importance the bonanzas of the past. In addition to the drainage operations, the question of a reduction in milling and transportation charges is being considered, and a plan to accomplish this object will most probably be adopted.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Amador Ledger, Jan. 28: The sensation at the Rose mine reported in my last has about subsided. The water that broke in from the old shaft is all taken out and work has been resumed. There is no change to note. There is but little quartz in sight, but what little there is has free gold visible to the naked eye and they hope it will lead to something permanent. The Sutter mine is still idle, but according to reports will start under a new regime in the spring. Making pipe for the Mahoney mine is under full headway. The iron is arriving as fast as they can make it. It will take about six weeks to make it all, when the work of digging ditch and laying pipe will be in order. Some men are now at work repairing and getting the mill in order, fixing the tail-race, adjusting water-pipes inside the mill, fixing up the batteries, etc. Altogether, it begins to look like business. The Lincoln is running along in about the usual way and is said to be paying. The sulphurets works are running full blast again.

El Dorado.

TOLL HOUSE.—El Dorado Republican, Jan. 29: The owners of the Toll House mine are nearly ready to start a ro-stamp mill at work on gravel from their mine. The machinery from a mill formerly in use on the ground has been moved to the vicinity of the shaft and put in complete order for work. Everything is contrived to handle the gravel with great economy, the machinery being self-dumping and self-feeding. Some fine-looking gravel has been obtained from the mine. We understand the company contemplates sinking another shaft farther west in order to reach some parts of the channel that cannot be drained through the present shaft.

ON THE DIVIDE.—Georgetown Gazette, Jan. 29: Being a visitor to Georgetown occasionally, I now give you a few notes of various localities of El Dorado county, notably the Georgetown divide. Having heard a good deal about the Van mine, my curiosity was excited to see it. I was very much surprised to see a well-developed mine, also a mill running in full blast, crushing and grinding what they call porphyry, but what scientists know to be decomposed quartz. There is a very large body of this quartz and from the easy way it is handled pays all expenses of running the mill (a Huntington) and prospecting the mine. When I was there it was supposed they had struck the ledge in face of cross-cut from the shaft, as they were hoisting some very rich ore. As I came over to Placerville I noticed the Taylor mine hammering away as usual, working a full force; also the Lone Jack mine, which is once more at work under its old superintendent, Mr. Lawrence. They have got the new Cunningham machine for hoisting ore and it is claimed to be the "boss," both for economy and power. I also visited the Alhambra mine, back of the Dalmatia, where J. M. Bryan, the superintendent, has got everything in apple-pie order, ready to commence crushing. He has been at work with a force of men for seven weeks cleaning out the tunnel and shaft, also putting up new machinery. For the short time they have been at work they have made things take on a different shape. As soon as the mine justifies it the company intend putting up larger works. There are quite a number of equally as good mines around, and all that is required is a little energy, backed up with some capital, to make them good paying properties.

Inyo.

CERRO GORDO.—Inyo Independent, Jan. 30: Good reports come from Cerro Gordo. There are better prospects now than at any time since the present management took charge of the mines. One six-horse team is kept busy hauling ore down from the hill to Keeler.

Modoc.

MINING TUNNELS.—Adin Argus, Jan. 29: There are two tunneling companies at work pushing tunnels into the heart of Hayden Hill, 15 miles south of Adin. The first company formed consists of C. J. McCoy, A. Greigg, B. F. Studley, C. A. Higgins and Dan McClane. They began their tunnel on the south side of the hill and are working northward, where they are told. The other company is composed of Messrs. Shanklin & Hornlein of Grasshopper valley, N. Bieher, and another gentleman whose name we did not learn. This company began their tunnel on the north side and expect to run it in a southeasterly direction for a distance of 3000 feet. Each company is confident of success and it is to be hoped they will find what they seek. No one can deny but that there are millions of dollars in the mountain if it is properly worked. Ten years ago the mines of Hayden Hill produced large quantities of bullion and times generally were flourishing in Big Valley on account of their success. During the past few years, for want of capital, but little ore has been taken out and business there has been almost suspended. The companies above named are composed of moneyed men and there is no doubt but that they will prospect until they find all the profitable leads.

Nevada.

THE HOLDSWORTH CLAIMS.—Transcript, Jan. 29: Jackson Lake in this county is as the bird flies, less than 20 miles in a north by east direction from Nevada City, although by the wagon-road it is about twice as far; and from Emigrant Gap on the Central Pacific railroad it is 16 miles by the usual course of travel. The lake has an altitude of about 6000 feet above sea level. Its out-of-the-way situation renders it but little known to the public, as comparatively few persons find their way there unless called by business. There are two men, however, who take intense interest in that part of the county. They are old prospector Holdsworth and his son, who have for a number of years endured the rigors of the severe climate there and submitted to being practically cut off from association with the rest of the world in the hope that they will eventually reap an independent fortune as a remuneration for their present abstinence from the luxuries of life. They have carefully and laboriously exploited the country thereabout with tunnels and shafts, and have come to the conclusion that it is the fountain-head of most if not all the gold mines that lie

between there and the Sacramento valley. They have made locations on six monstrous quartz ledges with well-defined croppings and all so situated that they can be worked by one tunnel that will give 1500 feet of backs, and they have christened these ledges respectively the West Point, Golden Gate, Golden Drop, Big Mountain, Red Top, and Red Top Extension. Scores of milling tests and assays have been made at this city and elsewhere of ore from the various deposits, and it is found to carry gold, platinum and nickel. In gold they say the lowest return has been \$20 a ton by milling. Two tons crushed last year at the Rocky Glen mill at Graniteville gave \$55 a ton, and it is contended that even then not more than half of the precious metal pounded out was saved. Capitalists went up there last fall and negotiated for the consolidated claims at the price of \$150,000 spot cash. But when they sent the papers up to be signed the Holdsworths found that a bond was what the capitalists were really fishing for. The papers are still unsigned.

AN IRON MINING CO.—Nevada Transcript, Jan. 30: There is a probability that a prominent iron mining company having smelting and other extensive works in Ogden and San Francisco, will shortly begin operations at this city. The company has this week through M. H. Brewer of San Francisco made eight locations along the rich and extensive deposits of iron ore situated on the northerly side of Deer creek, beginning at a point about two and a half miles below town and continuing to within a mile of Newtown, which latter place lies west from here. Negotiations for the property of Mrs. Hawke, forming the present eastern boundary of the company's claims, are now pending and likely to be consummated. The new locations are known as the Flora, San Francisco, Hidden Treasure, Iron Duke, Iron King, Lily, Monarch and Annie. The work of prospecting the property will be commenced without unnecessary delay, and it is expected that the erection of a smelter will immediately follow the favorable developments which are confidently anticipated because of what has heretofore been demonstrated as to the extent and value of the deposits.

A NEW GRAVEL MINE.—Transcript, Jan. 26: The Ogden brothers, experienced gravel miners, are engaged in developing the Gaylord & Bryant drift mine a quarter of a mile in a northerly direction from where the San Juan road crosses Rock Creek. The tunnel is in 180 feet and is evidently on the rim of a clearly defined channel, but it has been most of the way since starting in gravel (supposed to be from a break out of the main lead) which carries coarse gold. Various gravel miners contend that this mine is on the same channel as the Harmony, and that said channel instead of passing down through the Manzanita ground goes by way of the Nebraska and traverses the upper portion of Selby Flat, to the north of the Manzanita.

MINE BONDED.—Grass Valley Union, Jan. 31: The Washington mine, which is northeast of the Idaho mine and on the west side of Wolf creek, has been bonded by David Bryant from Herman Uphoff the owner. The Washington was a popular prospect some years ago, and it is believed will make a good mine if properly opened up.

ORMONDE.—Cor. Transcript, Feb. 3: There is considerable work going on at this place outside of the Washington Mining Co. Geo. W. Starr and Chas. Stokes of Grass Valley have a fine-looking property in the old Rodda ledge and its southern extension. The parties have already spent considerable money on the property in the way of purchase, annual work, etc. I am reliably informed that it is their intention to early in the spring resume sinking the old shaft which is now down 30 feet carrying a ledge six or seven feet in width and showing well in free gold and sulphurets. M. D. Cooley, superintendent of the German mine, is working five men all told. He has about 200 feet to run yet before striking his ledge. Henry Kohler of Washington is the owner of a fine-looking ledge close by the German, and running parallel with it on the west. Bright and early on New Year's morning two different parties relocated the Ocean Star quartz mine, which means more grub for some of the legal fraternity. Capt. D. S. Donohue has been at work till quite recently on his Uncle Sam ledge located near the mouth of Canyon creek. This property is one of the finest prospects as far as developed in this section. The White Brothers are developing a property on the north side of the creek from the Uncle Sam, which prospects quite rich in free gold, and several other parties are prospecting near by.

Placer.

REOPENING.—Placer Republican, Jan. 28: L. Remler, Dan Russell and Al, Ingram of Forest Hill have bonded the old Home Stake quartz mine in Volcano Canyon and are opening up the old tunnel which was run a distance of 630 feet years ago, but which was allowed to cave in and fill up. The ledge is about six inches thick, but the quartz assays from \$50 to \$100 a ton, and there is great confidence that it will prove a good property. Mr. Remler has lived at Forest Hill 30 years, but this is the first time he has ever invested in a mine.

THE PARAGON MINE.—"Considerin' everything, Abraham Breece and Judson Wheeler are prob'ly the two luckiest miners that ever struck Placer county," said an old resident of Forest Hill the other day. "They got the Paragon cheap, and in ten or twelve years have cleaned up pretty well on to three-quarters of a million in clear money." The old Paragon claim at Bath always has paid since 1857, both as a hydraulic and drift mine. The tunnel has not been worked on "scientific" mining principles. It wanders around under the mountain following the lead of the channel, and only gravel that paid has been taken out. The under lead, which is the one that has been worked and proved so rich since about 1880, has been worked to within about 20 feet of the May Flower ground, and when that remaining distance of 20 feet was worked out, old miners thought the gold-producing days of the Paragon would be over. But not so. Six or seven weeks ago the miners under the direction of Supt. W. H. Grenell were set to work prospecting a favorable spot about half-way into the tunnel, and the result is the discovery of a new and distinct channel running at nearly right angles with the old blue lead across the whole width of the Paragon claim. The old lead contained blue gravel and runs nearly north and south. The new channel is above the old one, contains red gravel and runs east and west. The distance across the claim in the latter direction is about

5000 feet. The old lead averaged \$18 a carload. The new red gravel averages only \$5 so far, but as Mr. Grenell has worked across it a distance of 185 feet and has not yet determined the full width, and as it costs only \$2.25 to mine and mill the gravel, the new channel may well be considered somewhat of a bonanza in itself. At present 27 men are working in the mine, but the force is to be increased.

Shasta.

NEW LOCATION.—Courier, Jan. 31: James Dow has undoubtedly struck it in a new location a few miles north of town. It is a six-foot ledge on the croppings, shows up on the surface for 60 or 70 yards, and prospects well in free gold and sulphurets.

TEXAS AND GEORGIA.—Shasta Co. Democrat, Jan. 29: The new Texas and Georgia ro-stamp mill and bucket tramway is now running like clock-work. Last Saturday the capacity of the tramway was timed, and in one hour it delivered 13 tons of ore at the mill.

LOST CONFIDENCE.—Last week James Salla of the Lost Confidence mine, Iron mountain, shipped 33,000 ounces of bullion, the cleanup from a month's run. The Lost Confidence is gaining the reputation of being one of the chief bullion-producing mines of the State.

THE GLADSTONE MINE on Kline gulch is one of the big bullion-producers of the State. Twenty stamps are in continual operation, producing about \$1000 a day, and yet this mine is in its very infancy. In addition to a complete milling plant, Supt. Clark has put in a dynamo plant and now lights the mill and all the buildings with an electric light, and in a few days the whole interior works of the mine will be lighted with an incandescent light. Everything about the premises is neat and inviting and the accommodations for the miners, 75 in number, are equal to any hotel in the county.

A COMPARISON.—Mr. Chas. Gruss, who mined in Deadwood last year and is quite well known here, a few days ago returned from an extended visit to Plumas county, and in a few days will go to Deadwood. In speaking of mines and comparing the mines of Trinity and Shasta with those of Plumas, he says the latter county's mines, which will produce ore that will mill an average of \$3 to \$5 a ton, are considered big mining properties and are operated on a big scale, while in Shasta and Trinity counties, mines that will produce ore that will not mill an average of \$10 or more are considered unprofitable. He says there is a world of ore in Shasta and Trinity that will mill an average of \$5, but in Plumas they would be developed into big paying properties. But most all the gold ore in Plumas is free milling and is reduced by water-power, and to that extent Plumas has a slight advantage over Shasta. The miners of Plumas utilize their natural water-power, while in Shasta the water-powers are not harnessed and put to use operating mining plants. Mr. Gruss is an experienced, practical miner. He believes Shasta county's mineral resources are second to none in the State, and if the miners of Shasta would take a few observations as to how low-grade ore is worked profitably in Plumas and apply those practical methods here, Shasta county's mining enterprises would boom.

Sierra.

SIERRA CITY.—Mountain Messenger, Jan. 29: The Young America Co. has struck a pay chute in No. 4 tunnel. The width of the ledge is not yet known, as they had not got either hanging or foot-wall. The company will soon be able to dispense with the tramway and dump the ore from the cars into the mill. The Berger mine is running only one battery, owing to want of water. The ledge where the men are now working is very wet. The Phoenix Co. has been sinking a shaft on the ledge, with fine prospects. Mr. A. C. Busch, who now owns the whole property, has given an order for lumber for a new mill which will be erected just as soon as it can possibly be done. The Colombo mine is running and looks very well. This promises to be a good property. Al Smith and Frank Stewart are sinking a shaft at Charcoal Ranch for a gravel channel.

Siskiyou.

THE BLUE LEAD.—Yreka Journal, Jan. 28: The Yreka Blue Gravel Mining Co. has been incorporated, the principal object of the company being to prospect the channel which is supposed to run near the town. For this purpose subscription lists will be circulated in a few days. If a sufficient amount is subscribed, certificates of stock will be issued to the subscribers and work commenced. All money paid for stock will be used in the actual expenses of prospecting, and if nothing is developed, and there is any money left, it will be returned pro rata to the subscribers. No assessments will be levied, unless rich developments in prospecting should warrant large expenditures in the future, in which case the stock will undoubtedly be worth more than its par value. There can be very little doubt, from all indications, that the channel, which is now generally conceded passes through this county, will prove a paying one, there being no reason why it should not pay as well in this vicinity as in the Cottonwood district, where it has been prospecting for six or seven miles. The surface indications are exactly the same. If the channel should prove to be rich, the result would be of incalculable benefit to the business interests of Yreka and the county generally.

Trinity.

TAPPED IT.—Journal, Jan. 31: Fisher Gulch Mining Co. on Canyon Creek has tapped the ledge on the Chloride location with the tunnel that they have been running for some time. At last accounts the tunnel had not been run through the ledge, so nothing definite is yet known regarding the quality of the ore. The mill on this property has been running regular during the daytime for about ten days, but the last few cold nights have caused the water to slack off so the mill has been shut down for the present.

NEVADA.

Washoe District.

YELLOW JACKET.—Virginia Enterprise, Jan. 31: Shipping 40 tons daily of ore worth \$18 a ton, as per battery assays.

JUSTICE.—The south drift from No. 1 winze, 490 level, was advanced 16 feet the last week; total distance, 92 feet; face in fair-grade ore. Shipped 183 tons of ore worth as per battery samples \$17.90.

KENTUCK.—The west crosscut from the north lateral drift, on the 950 level, was advanced 8 feet

during the week and reached the hanging-wall, passing through quartz of low grade containing pay. Started a raise in the lateral drift opposite the crosscut in quartz giving low assays. The raise in the east ledge on the 1000 level is up seven feet, and the top is in quartz containing occasional spots of ore. Have also started a raise in the west ledge, which is up seven feet in low-grade quartz.

CROWN POINT.—The northwest drift on the 500 level has been advanced 27 feet since the last report, and is now out a total distance of 155 feet. The face is in porphyry and quartz giving low assays. Will start a west drift from it during the coming week.

CON. IMPERIAL.—Work is still being confined to following up and taking out small streaks of ore on the upper levels and overhauling the old stopes of the mine.

BELCHER.—Have stopped the west crosscut from the south drift from No. 3 crosscut 300 level, and started an east crosscut opposite it. The west crosscut from the south drift in the west ledge, 300 level, has been advanced 40 feet, and is now out 100 feet. Have stopped it temporarily, and started an east crosscut opposite it. The 1400 raise has been advanced 15 feet, and is now up 65 feet. The top is in low-grade quartz. It is expected to connect with the 1500 winze in a very few feet.

OVERMAN.—Extracted 382 tons and 800 pounds of ore. Shipped to the Brunswick mill 390 tons of ore. Battery assays average \$14.17 per ton. Upraise from the northwest drift on the 1100 level has been extended 9 feet, passing through ore; total length, 124 feet.

CONFIDENCE-CHALLENGE.—The Joint Confidence and Challenge west crosscut from north drift on the 1100 level is out 113 feet. The face shows quartz having no value.

SEG. BELCHER.—The 600 level, south drift, has been extended 29 feet during the week, and is now out 129 feet; the face is in soft porphyry.

SAVAGE.—Milled 570 tons of ore, the average battery assay of which was \$15 per ton. Bullion on hand, \$19,777. On the 300 level east crosscut was advanced 27 feet; total length, 55 feet; face in porphyry. On the 1300 level we resumed work in the north upraise, which is now advanced 75 feet; the top is in ore—old fillings.

HALE & NORCROSS.—The west crosscut on the 800 level was extended 25 feet; total, 300. This drift has reached the west wall of the ledge at the end of the north drift on our north boundary line, and opposite the above-mentioned crosscut we have started an east crosscut and advanced same 10 feet in quartz and porphyry.

CHOLLAR.—Winze 80 feet south of north line, 750 level, is down 43 feet, bottom in quartz yielding low assays. Station from the incline, 1300 level, is in 10 feet. Repairs to the head main incline are nearly completed. Extracted and sent to the mill the last week 546 tons of ore, the battery assay of which was \$17.54 a ton.

POTOSI.—East crosscut from winze, 1130 level, is out 135 feet. In the face are bunches of quartz yielding assays from \$6 to \$20 a ton.

EXCHEQUER.—East crosscut, 150 feet south of north line, 500 level, is out 440 feet; face in porphyry. East crosscut near the south line, 600 level, is out 276 feet; face in clay, quartz and porphyry. East crosscut on the north line, 600 level, is out 50 feet; face in clay and quartz.

ALPHA.—The south drift from east crosscut from shaft, 600 level, is out 26 feet; face in quartz giving fair assays.

SILVER HILL.—Northeast drift, 160 level, is out from the winze 610 feet; face in porphyry. Northwest drift, 334 level, is out from shaft 835 feet; face in porphyry.

NEW YORK.—East crosscut 100 feet north of shaft, 4100 level, is out 34 feet; face in clay and quartz. East crosscut 200 feet north of shaft, 1100 level, is out 32 feet; face in porphyry. East crosscut 260 feet north of shaft, 1100 level, is out seven feet; face in clay and porphyry.

WARD COMBINATION.—East drift from shaft, 1800 level, is out 805 feet; face in porphyry.

ANDES.—During the past week north drift, 420 level, was advanced 16 feet in a formation of quartz and porphyry. East crosscut from south drift on 420 level was advanced 10 feet; face in clay and porphyry.

GOULD & CURRY.—200 level: In northwest drift, at a point 125 feet north of west crosscut No. 2, started west crosscut No. 2 and advanced same 15 feet, passing through quartz showing some value. 250 level: West crosscut No. 1 has been extended 25 feet; formation porphyry with streaks of quartz; total length, 60 feet.

BEST & BELCHER.—800-foot level: West crosscut No. 2 has been extended 16 feet, through porphyry, clay and quartz; total length, 448 feet. 1200 level: West crosscut No. 1 has been extended 18 feet through porphyry, clay and quartz; total length, 89 feet.

OCCIDENTAL.—During the week the work in the mine has been confined to repairing and retimbering the main tunnel on the 550 level.

UTAH.—On the 725 level the northwest lateral drift from the main west drift from the shaft has been extended 37 feet; total length, 369 feet, in a porphyry and clay formation.

Highland District.

THE MENDHA.—Pioche Record, Jan. 29: At the Mendha mine, Highland District, work on the new hoisting shaft goes steadily ahead and it has now attained a depth of nearly 300 feet. A great deal of work is connected with it, however, and a month will probably elapse before the lower workings are tapped, when the output of ore can, if necessary, easily be doubled. In the other workings, the mine looks as well as ever, and new ore is being uncovered every week.

Jackrabbit District.

DAY MINE.—Pioche Record, Jan. 29: The new ore find in the Day mine mentioned by us two weeks ago, has developed into a magnificent thing itself, and the end is not yet. The strike was made above the old working tunnel level on the west side of it and about 700 feet from its mouth. The ore has been drifted on for a distance of 75 feet, and raised on for the same distance, and the work is still going on. The walls range from 4 to 18 feet apart and will average 10 feet. The ore differs both in appearance and analysis from the average ore of the mine, containing 8 to 10 per cent silica, and will average 40 oz. in silver per ton when knocked out and no sorting. Picked samples range from 60 oz. to 600 ozs. per ton in silver. In the

tunnel also, which is going in west of the main working tunnel and parallel with it, good ore was struck six days ago. In character it strongly resembles that of the new strike, the vein being as wide as three feet, with an average of 12 inches. The ore here runs at about 35 ozs. silver per ton. This tunnel is running toward the new strike and will pass in under it, but is yet 500 feet distant. The management is highly pleased over the outlook.

TUSCARORA DISTRICT.

DEL MONTE.—Tuscarora Times-Review, Jan. 30: First level: North crosscut advanced, cutting streaks of low-grade ore.

NAVJO.—Stopes below the 350-foot level are looking better and producing a good grade of ore. **COMMONWEALTH.**—Fourth level: East crosscut advanced 28 feet; west crosscut being repaired.

NORTH COMMONWEALTH.—Through combination shaft—First level: Stopes produced 15 cars of first class ore assaying \$378 per ton, and 70 cars second class assaying \$26 per ton.

BELLE ISLE.—Stopes on the 350 foot level continue to look very good indeed. A crosscut has been made through the ledge at the south end of the intermediate, showing some rich ore on the west wall with a large mass of concentrating ore. Work has been resumed in the face of the west crosscut, progress 3 feet, face looks very encouraging. Sent 232 tons in concentrator, estimated assay value \$34.43, giving 20.15 tons wet concentrates, estimated assay value \$251.61.

NORTH BELLE ISLE.—East crosscut, 400 level, extended 20 feet. North drift from Belle Isle 450 extended 12 feet, vein large, showing bunches of good ore. Joint east crosscut, same level, extended 15 feet and suspended. The 500 stope has improved since last report. South intermediate from No. 4 chute extended 10 feet, total 19 feet south of the vertical winze, the face shows six inches of solid ore. Have resumed work in No. 4 upraise, 600 level, progress 9 feet, in hard quartz. Concentrator crushed 232 tons Belle Isle ore, assay value \$34.43, yielding 20.15 tons concentrates, assay value \$251.61.

ARIZONA.

GUNSGIGHT CAMP.—Tucson Citizen, Jan. 30: Mining progress in Arizona has never been more rapid nor more encouraging than during the past year. In all parts of its domain new properties are being opened and old ones reopened. This is due to various causes. Favorable legislation has given it an impetus, but not in all probability such a one as have improvements in mining machinery. Old mines have worked under the constant disadvantage of rude and clumsy machinery, bearing the comparison to the present mining apparatus that all modern improved machinery does to its predecessors. Improvements in mining machinery have fully kept pace with others, and mines once worked at a loss are now made to bring good and profitable returns. The Gunsight mine, 125 miles southwest of Tucson, is one of the pioneer mines of Arizona. The Spaniards worked it, and for the last 35 years Americans have been in possession of it. Its teams have thronged the road to Gila Bend, its railroad outlet, and its enormous output has been bewildering. Something like a million dollars have been expended on this camp, but only at times has it been profitable. The ore, which is a good-grade silver, has been worked with the old style cannon-ball process mill, which extracted but a share of the real value of the ores. Different companies have been in management of it, but the machinery was so utterly inefficient that the enormous outlay on the property brought poor returns, and its great dumps of ore piled high were never worked. Gradually its large force of workmen was reduced, until but 12 or 15 men were employed, milling the best of the ore. Now the old regime is at an end, and Gunsight will again take its place as a prominent, and this time a profitable camp. A party in from there states that it has been placed under the superintendency of J. C. Rankin, a practical mining man, who will work the ores on the dump and some of extra value lately uncovered in one of the old shafts, by a new and profitable process, which will extract almost their full value. The mill will be of a 20-stamp capacity, and is now being put in. The scarcity of water is at present something of a hindrance to the working, but will soon be remedied by cleaning out the wells. The work of rebuilding, renovating and removing debris will be pushed with all speed. The camp is to be worked for profit, and it is a matter of congratulation that the old mine is no longer to be almost deserted, but will team with life and business.

FROM TABLE MOUNTAIN.—Tucson Star, Jan. 30: Capt. J. D. Burgess is in from his Table Mountain camp, Pinal county, and reports everything rubbing at the Mammoth. Louis Ezekiel is delivering lumber sawed in the Santa Catalinas to the Mammoth Co., for use in the mine. A number of men are doing prospecting and development work in the McGarrish and Bunker Hill districts; much rich ore is being taken out at Stringerville for shipment. The Table Mountain mines are developing finely and great bodies of copper ore rich in gold are being shown. Rumors of nearly consummated sales of several mines in the vicinity of the Mammoth are prevalent, and as the mines are known to be good ones, a boom is looked for in the near future.

COLORADO.

MIXSELL MILL.—Idaho Springs News, Jan. 29: There is a great demand on the Mixsell mill at present. Mixsell says he could run 50 stamps steady if the mill was supplied with that many. The Casino mine produced from last May to January 1, over 240 tons of ore valued at \$14,600. In that time 700 feet of drifting was done. The Treasure Vault, which is under the management of Foulk Williams, made a shipment of two lots of ore to Chamberlain & Co.'s sampling works this week. The handsome return of 27 ounces gold per ton was obtained from the first lot. The second lot gave returns of ten ounces per ton. A. A. Hoskin has just let a contract to drive a crosscut tunnel to reach the Tarbet lode in Squirrel gulch. This property is now owned by Evan Davis of Wisconsin, who will push the tunnel to the lode as rapidly as possible. It will tap the vein at 600 feet from the surface.

THE DEEP SHAFT.—Aspen Times, Jan. 31: The level that has been run from the Deep Shaft into the Enterprise ground has struck the contact. It was

reported that a good body of ore had been opened, but this is denied. The contact is found to be very wet and a large volume of water has been flowing out through the level. It is thought, however, that the contact will soon drain out.

THE ASPEN.—The Aspen mine is now employing 275 men. The output has been increased a little and is now nearly up to the old figures, the weekly shipments footing up to 900 tons.

SMEILER AT GRAND JUNCTION.—H. K. Devereux came up Saturday from Grand Junction. He reports that arrangements have been made to connect the Tintic district in Utah with the Rio Grande Western road. This, in his opinion, means that a smelter will be built at Grand Junction. He met General Palmer at Glenwood and that gentleman told him that works would be established at the point indicated in a very short time.

THE EDISON No. 2.—The lessees of the Edison No. 2 held a meeting last night. The resignation of Manager Thomas Kerwin was accepted and James Warner was elected to the position. The mine is now looking much better than ever before. No ore is being shipped except what is taken out in running drifts. The ore body holds out well and stoping ground is being prepared. There is a good five-foot vein of ore in the mine and the lessees will reap a rich reward.

DAKOTA.

CHLORINATION WORKS.—Deadwood Pioneer, Jan. 28: The new barrel for the chlorination works, ordered by Harris Franklin while in Chicago, will be four, and not five tons, as heretofore published. It is expected here about March 20th, and will increase the capacity of the works to 70 tons per day. Shipments of ore from the Golden Reward to the works still continue.

D. & D. SMELTER.—Bids for furnishing lumber for the new D. & D. smelter were opened yesterday, and the contract was awarded to Col. W. M. Pratt, his bid being the lowest. Work on the foundation is progressing nicely.

CALEDONIA.—Richard Blackstone has been appointed superintendent of the Caledonia, and he will take charge of the property, together with the De Smet and the B. H. & Ft. P. R. R. It is rumored that he will shortly resign his position as superintendent of the railroad.

RICHMOND MILL.—The Richmond mill at Galena started up Monday, and is now running in full blast. A partial cleanup was made yesterday, and the result was highly satisfactory to Supt. Havens. All the ore is coming from the Richmond mine, and is looking better than it ever has before.

MONTANA.

THE ELIZABETH.—Phillipsburg Mail, Jan. 27: There has been considerable excitement about this property both here and in Helena and St. Louis for some time past, and particularly for the past week or so. The immediate cause seems to have been a report telegraphed to St. Louis by Supt. Wier announcing 15 inches of ore in the east drift of the north crosscut. While this of course is true, it appears that the ore is of low quality and nothing to go wild over; but there is no doubt in the world but that ore of good grade and plenty of it will yet be found in the south vein, between their present workings and their eastern end lines.

HATTA.—This company is still sinking, and the shaft is now about 320 feet in depth and the new hoist is handling the water in good shape, but more water is expected as depth is attained. Supt. Holland came up from the mine the other day and says that they now have about 700 or 800 tons of ore on the dump, but not of very high grade. The shaft at present seems to be in the vein and the ore is daily increasing in value. They now have from 8 inches to one foot of gray copper that assays well.

A LESSON IN MINING.—Review, Jan. 29: The Golden Leaf M. Co. which owns the old Empire property, some four miles west of Marysville, is teaching all the mining companies of the State a lesson in cheap mining. The property of this company is not advantageously situated. The 60-stamp mill is nearly a mile from the mine, with which it is connected by a tramway. All the machinery at both the mine and mill is run by steam; water is scarce and cannot be freely used, and the site is four miles from a railroad, over a mountain road with very steep grades. The work of mining and milling is done by 50 men. During the month of December the expenses of the mill and mine (and everything used was accounted for) were \$7100. Four thousand tons of ore were milled, the average assay of the ore being \$3.70; the assays of the tailings showed \$1.20, leaving the value of the metal (gold) extracted at \$2.50. So the gross product of the mine was \$10,000. In addition to this there was 3000 tons of ore in the bins of the mine and mill, and the workings of the mine were in much better condition than they were in the beginning of the month. This shows that Mr. J. Henry Longmaid, the manager of the company, thoroughly understands his business, and that he has an able corps of assistants and good workmen. Mr. Longmaid sets them all a good example, for he does what is ordinarily the work of four persons. He is manager, superintendent, assayer, bookkeeper, and timekeeper. The company will not permit a saloon on the place, and neither is there a gambling house, yet Mr. Longmaid says that he has many applications for work from men who know these facts, which he is unable to grant. The plant, outside the mine, is worth about \$200,000, and if this property can return a profit under such circumstances, with the same industry, energy and economy, nearly every mine and mill and smelter in Montana ought to make money.

IDAHO.

DELAMAR.—Idaho Statesman, Feb. 1: Besides the world-renowned DeLamar mine, several other rich mines will be opened up and worked with large crews of men early in the spring. Under the careful guidance of Dr. Munson, superintendent, and J. M. Healy, foreman of the main workings, a Statesman representative went through the mine. At a depth of some 400 feet from the surface one comes upon a vein of ore 80 feet in thickness, which is very rich in both silver and gold. As fast as the work of developing the different drifts and tunnels is completed, substantial frames are put in place to prevent accidents from caving walls, which gives an

air of solidity to the whole works. Everything is done to secure the safety of the men and the most rapid handling of the ore. About 200 feet above the hoist works and carpenter shops is located the mouth of the upper tunnel and works. Here is also the Anchor shaft, named after its discoverer, H. C. Anchor, who is foreman of this division. It is here that several nuggets of almost pure silver have been discovered, one weighing something over 26 pounds and valued at \$8 per pound. The men working in this department average two sacks of high-grade ore per day, each sack valued at \$40. Thus we see that no one can even estimate the fabulous wealth represented by this (the DeLamar) group of mines. To facilitate the rapid handling of ore in the lower tunnels, Capt. DeLamar intends placing on the upper levels powerful electrical hoists, a part of the machinery for which is on the ground.

BRIGHTER PROSPECTS.—Salt Lake Tribune, Jan. 29: Frank Willis, who is down from Custer county, Idaho, says that the mining prospects in that county are much brighter than a year ago. The mines that are being operated are looking better than usual and more ore is being opened up. Just as he was leaving home there was a rumor that a good strike of ore had been made in the Post Boy in the tunnel on which work has been progressing the past year. The Post Boy is on the Ramshorn hill and on the same mineral belt as the Ramshorn, Skylark and several other mines which have been producing so largely the past 10 years. The winter has been very pleasant on Salmon river so far.

STORMY HILL.—Avalanche, Jan. 31: Mr. Longmead returned from Salt Lake and Mr. H. Stephenson from Baker City, during the week. They found on their return that work had been progressing favorably on the Stormy Hill shaft which is now down 260 feet. The ledge has widened slightly, and Mr. Harris the foreman was able to show them some rich samples of ore taken from the bottom. When the shaft is down 300 feet they will begin running drifts both north and south. The mine now looks so promising that it quite assures the building of a mill on the mountain to work the ore taken out. This mill will be built in South Sinker gulch, near where the Lightning creek road crosses, where the owners have secured a site and located water rights.

TRADE DOLLAR.—The winze, which was sunk to connect tunnels 1 and 2 on the Trade Dollar is now down to level of No. 2. The face of No. 2 level is still 270 feet south of this winze but is being pushed by a double shift to a connection with winze, the ore growing better as the tunnel is advanced. In the face of No. 1 tunnel which is now 128 feet north of the winze, the ledge has two streaks of ore, one four and the other three inches wide, of high grade.

BLACK JACK.—The manager of the Black Jack is still working the Rand drill on the ledge recently struck. The drift is now run south of the tunnel 60 feet. The ledge at this point is four feet wide, ten inches of which is very rich and the balance good milling quartz.

NEW MEXICO.

MOGOLLONS.—Silver City Enterprise, Jan. 30: Geo. Rowe & Co., lessees of the Consolidated claim, which lies to the south of the Mountain Key upon the same vein, are working four men. The shaft is down over 100 feet. Sufficient high-grade ore to pay expenses is being taken out and shipped. A big boom may be looked for throughout this entire camp when spring opens. The Confidence Co. are driving the main level on the Confidence ahead and are now in 670 feet from the opening at the gulch. Work has been suspended on the old location shaft at a depth of 90 feet below the main level, a total depth of 215 feet. The shaft shows fully six feet of milling ore worth from \$28 to \$45 per ton and which will probably average \$32 to \$35 in a mill. Captain Frank Vingo, superintendent of the Mogollon Consolidated Mining Co., is pushing business on the Little Fanny. Everything about the mine is being put in shape for a long and good paying millrun. A few men are taking ore from the old Sheridan mine which will be run at the mill. The Last Chance Co. have most of the machinery for their 20-stamp mill on the ground. The grading of the millsite is completed and the framing of timbers is rapidly progressing.

PYRAMID PICKUPS.—Western Liberal, Jan. 30: A number of additional hands have been put to work during the past week. The fame of the old camp is being spread, and miners looking for work are coming in almost daily. Messrs. Lincoln and Butnub are developing their property; it was formerly known as the Henrietta, and has produced some good ore. The ore was shipped to Freiberg, Germany, and after paying all expenses, netted the company a handsome sum. Some good ore is being extracted from the stopes on the 100-foot level in the Viola. The lost lead, or rather the one which had never been really found, has been caught in the east crosscut of the south drift on the 100 level. The superintendent and all hands are highly elated over the prospect of a big mine. The vein is as yet small, but is widening every foot it is penetrated. The ore is a high grade of sulphuret, and closely resembles that of the Bob Lee, which is sufficient guarantee of its excellence.

OREGON.

OREGON MARBLE AND LIME.—Bedrock Democrat, Jan. 29: Mr. W. L. Peak, manager of the Oregon Marble & Lime Co., called yesterday. The base of operations of this company is four and one-half miles west of Huntington in the Burnt river canyon, the railroad running within a few rods of the company's works, thus enabling the company to place their product on the cars at a very trifling cost. The capacity of the works is one hundred and fifty barrels of lime per day and two carloads of lime rock per day. The company employs about twenty men and will increase that number shortly. Mr. Peak tells us that his company finds a splendid market for their lime as far east as Wood River and west throughout Oregon and Washington, their lime being the equal of any on the market. The lime rock is used as flux for smelting purposes and a ready purchaser for all the company can supply is found in the Oregon Iron & Steel Co., whose works are located at Oswego, Oregon. Mr. Peak is now busily engaged enlarging the present plant of the company, building kilns, etc., in anticipation of a heavy run the present year. The company is com-

posed of a number of very wealthy gentlemen, among them William Ladd, banker of Portland, Thos. Rourke, of the First National bank of Pendleton, and Sutton & Beebe, ship-chandlers of Portland.

UTAH.

DEEP CREEK INTEREST.—Salt Lake Tribune, Jan. 30: The Deep creek interest still keeps up among prospectors and mining men. Properties are being secured by investors, while quite a number of small syndicates have been out prospecting and making locations. One incident shows the interest and confidence that men in this city have in the Deep creek mines. A week or so ago town lots at Clifton, a prospective mining town for that one district, were put on the market at \$25 each, after which the price was raised and this week 27 lots have been sold at prices ranging from \$50 to \$200 per lot. The value of the 20 or 30 mining districts out in that country depends greatly upon the early building of a railway thither. The low-grade ores, in which the country chiefly abounds, cannot be mined and marketed to profit without a railway, but there is such a feeling of confidence that the road will soon be constructed as to have doubled the values of the mines and prospects in the estimation of their owners and would-be purchasers. Mr. Bacon is expected back in two or three days, and he ought to bring good news regarding the railway. There is fair prospect of some gold mills going into the Deep creek country before long, even if the railway does not begin to materialize soon.

NEW STRIKE IN COTTONWOOD.—McVicker made an assay yesterday of some ore sent from Little Cottonwood, which went 55 per cent lead and 94 ounces silver. It is claimed to be from a new strike in the vicinity of the Emma mine.

STANLEY AND CONGO.—The Stanley mine, Big Cottonwood, has about 100 tons of ore on the dump ready to send to market when the roads open in the spring. The Congo is also getting out. These two properties are doing well and their stocks are both rising in value in the Exchange.

THE WALL MILL AT OPHIR.—Col. Wall came in from Ophir yesterday. He has his mill in complete order and would have it running but the weather is so cold there that the water-power is in too solid lumps for his purposes. He hopes to get started soon.

STRIKE IN THE TURK.—The Turk mine, which only began genuine development lately, and which is at the head of Dragon hollow, Tintic, appears to be in luck. Only a few days ago they made a strike on good ore and now, in continuing their work, have gotten on to even better ore. The Turk was owned by persons who did little work on it until Dr. Chamberlain got hold of the property last fall and has been developing it. Later a company was organized among some gentlemen in this city, and work has been going on finely ever since. The last ore struck is reported to be gray carbonates and to run very high in silver. The company has an option on the Martha Washington and June Rose, near Silver City, of which the former is already a shipper of good ore.

THE SNOW WILL HINDER.—Salt Lake Tribune, Feb. 1: The storm will probably cause some of the mines to stop shipping ore, while in others it opens the way for hauling from the mines. Both the Ontario and Daly had to suspend ore hauling the past two or three weeks because there was too much snow for sledding in, and too much for wheels, but the late fall of snow has made the roads all right for the hobs, and ore hauling has been resumed. Ores are coming in pretty regularly now, and the smelters are getting about enough to keep their stacks running. The usual amount of Nevada ores coming in.

HANAUER SMELTERS.—The Hanauer smelters keep their furnaces running, and have a good stock of ore on hand.

ASSAYING JACKSON ORE.—Hodges was busy making assays yesterday, among which was 15 tons of Jackson ore from Eureka, Nevada.

CONCENTRATES RECEIVED.—Creole concentrates to the amount of 45 tons was assayed yesterday. It ran 40 per cent lead, 34 ounces silver and one-tenth ounce gold. This was concentrated at the Crescent mill and it went to Denver.

DRY ORES.—A large portion of the ores coming in are of the dry kind, such as the local smelters do not care to reduce. This suggests an opening in this valley for a custom mill for treating such ores as carry but little or no lead. There is much of this class that could be reduced better in a mill than by smelting.

WASHINGTON.

THE STANDARD OUTLOOK.—Ruby Miner, Jan. 29: Phil Perkins and W. S. Wiggins are making a great showing on their Standard mine just north of town. Sinking on a ledge at a distance of 25 feet there is now in sight a 4-foot body of ore, of which 2 feet is mineral which will average 200 ounces of silver and about 30 per cent lead per ton. Specimens go away up, but they don't go anything on that. It is the large body of high-grade mineral which now pleases the fortunate owners. Phil Perkins says that after exploring the ledge at his present position he will immediately run in a tunnel to tap it 100 feet deeper.

MORE PLACER TALK.—Benjamin Hall spent a couple of days in camp last week and returned Sunday to the Similkameen where he is engaged in mining. Mr. Hall is enthusiastic over the placer grounds of the Similkameen, and his good judgment in mining affairs makes his views interesting. Said he: "With a diving suit I could bring up \$5000 gold in two weeks from the bed of the river. There are numerous pot-holes where men with an ordinary shovel have scooped up from \$50 to \$100 a day and this too where a strong current swept away a large part of the gold before it could be lifted to the top. The scoop shovel can only be used in shallow water where, of course, the current is swiftest, but with a diving apparatus a man could go into deeper waters where the largest deposits exist. I do not understand where that gold comes from. The river is crossed by ledges which on one bank are a porphyry and on the other a pebbly or modern formation, and while carrying gold scarcely account for the large quantities which are known to be deposited in the river." Mr. Hall reports that the ditch which is to carry water to Bob Allison's placer grounds, some two miles from the river, is about completed.

MECHANICAL PROGRESS

Cast Iron vs. Wrought Steel Columns.

In searching for information as to the relative advantages of cast iron columns over those made of steel, we have had communicated to us the six lucid and forcible reasons which follow, showing why cast iron is to be preferred: 1. Economy. Cast columns are much less expensive than steel columns required to carry the same load. 2. Speed of delivery. Cast columns can be entirely supplied by all foundries. Much less time is required for manufacture of cast iron columns than for the riveted steel work. 3. Adaptability. A cast iron column can be made of any shape desired. Connections can be arranged for attaching other parts of the construction much more readily and satisfactorily than can be done in the use of steel columns. 4. Value as scrap. In case buildings erected are to be reconstructed or demolished, the cast iron as scrap has a much higher value than the steel. 5. Corrosion is much less rapid, and much less destructive to cast iron than to steel. Cast iron may be exposed for years and show very little loss from rust. Steel after an exposure of a few months will deteriorate very rapidly, the whole surface of the metal peeling off repeatedly in scales, while anything is left. 6. Cast iron columns have been well tested by use during a very long period. Steel columns are still an experiment. What time will do with large structures supported by riveted work and liable to rapid corrosion remains to be seen.

To the strong and impressive reasons, above specified, we are able to add the personal knowledge of some experts that, in several of the lofty buildings in Chicago, cast columns were furnished at 35 per cent to 51 per cent less than estimated for steel columns—a verdict of experience which speaks with a very loud emphasis on the question of relative cost. The same authorities tell us that they have often found the sustaining capacity of cast columns as much as 100 per cent greater than that of steel columns for same load and use. Positive facts like these are ramparts of certainty, alien to all the processes of theoretic assumption, and they greatly strengthen the position occupied by the advocates of cast iron columns. It should be distinctly and fully understood, however, that the decided superiority claimed for cast iron columns over the customary riveted work of steel has no reference whatever to tensile property, or power to resist the strain of drawing apart, but relates to power to resist the crushing strain of superincumbent weight, a column's capacity to hold up against pressure without giving way being its supreme standard of excellence. So far as our inquiries have extended, we have not found any record or any recollection of cast iron columns breaking by pressure from over-weight. The absence of such an event from a wide range of experience possesses a significance which requires no comment. Among the other advantages claimed for cast iron is greater safety in case of fire, as the liability of the riveted steel article to warp, curve and yield under the influence of severe heat is a defect in any upright support loaded with a heavy mass.

In regard to comparative tendency to corrosion, there is really no dispute, as even Carnegie, Phipps & Co., in an article in their own book on structural steel, state that the liability of rust or oxidation is greater in steel than in cast iron.

One competent authority expresses the opinion that "the great and effective arguments in riveted wrought columns are that rolling produces sound, uniform material which can be inspected easily, while cast iron is liable to hidden defects which the average architect cannot discover, and consequently never feels safe about." This authority tells us, finally, that "if cast iron is good enough, and can be produced sound enough, for locomotive cylinders, it certainly will regain its lost ground for building purposes, when the makers wake up."—*Industrial World, Chicago.*

A NEW METHOD OF ALLOYING IRON AND STEEL WITH ALUMINUM.—Our attention has recently been drawn to an invention which promises to come to the front as a new and important agent in the manufacture of iron and steel, and which has special interest to all iron-founders, inasmuch as it increases the fluidity of the iron, securing better metal and thoroughly preventing blow-holes and faulty castings. The wonderful improvement iron and steel undergoes when a small quantity of aluminum is mixed with it in a molten state has long been known; but the great cost of the material, its easy volatilization, and the consequent impossibility of using it with any kind of blast, have so far stood in the way of generalizing its employment in furnaces on a large scale. Its use has, therefore, been mainly confined to manual mixing in crucibles, but the result is not always satisfactory, the iron frequently becoming streaky and showing undissolved needles of aluminum. The present invention seems to remove these serious objections and to open up an entirely new era for the employment of aluminum on a large scale, inasmuch as the expensive commercial aluminum will no longer be used, but a cheap flux very rich in alumina and easy of reduction in a blast furnace. This flux, when brought into a fusing state in the presence of molten iron or steel, gives off metallic aluminum gases or

vapors having a strong affinity for the metal, and the iron in this state absorbs these gases in *statu nascendi*, thus forming not a mere mechanical alloy, as in the old process, but a new and perfect metallic compound of great tenacity. Mr. T. Freeman, F. G. S., of 200 Phoenix street, London, has been deputed by the patentee to make the necessary arrangements for the introduction of this new system. —*Colliery Guardian, London.*

THE WONDERS OF SCIENCE multiply. Some prove fakes, some are harnessed as everlasting verities. One is announced in Switzerland. Dr. Mandruff, of Geneva, claims to have invented a machine, described as a simple device; a solid sphere of copper, 40 centimeters in diameter—about 16 inches—contained within a sphere of zinc 50 centimeters in diameter. The two spheres revolve in opposite directions at a rate of 500 revolutions a minute, and the space between is kept filled with steam at a pressure of six atmospheres. It is said that from a half horse-power of motive force an electric current is developed sufficient to run 500 incandescent lamps. As ten lamps are reckoned to a horse-power, this means 50-horse power in electricity. Until further verifications are received this discovery must be taken with several grains of allowance. In the above connection we find the following: Another marvel is announced in the shape of a photographing phonograph. M. Leon Esquille, a Mexican, is said to have perfected a marvelous invention in electricity and photography. By speaking into a photophone transmitter, which consists of a highly polished diaphragm, reflecting a ray of light, this ray of light is set into vibrations, and a photograph is made of it on a traveling band of sensitized paper. If the image of this photographic tracing is projected by means of an electric arc or oxyhydrogen light upon a selenium receiver, the original speech is then heard. What next?

WINDING WIRE SPRINGS.—In winding an open spring of wire, all that can be calculated on its reflex force after being "shut," or compressed, are the elements of material of the wire, temper of the wire, size of the wire and diameter of the coil. These calculations are easily made, or so easily that any error may be easily rectified, if the spring should not prove yielding enough, by stretching its coils apart. But a close spring is a different matter. In this there should be more than a closeness of coil; it is requisite that the closing-up inclination of the coil should be greater than the opening resistance, in order to get the greatest power from the spring. This condition may be obtained by holding the winding wire back toward the winding end, even if the leader is "off" from the open end, if the wire is strong enough to sustain the tension, as the result will be an apparently open-wound spring, that is, a closely coiled spring as soon as the end is released. To increase the intensity of a spiral spring (close wound) the wire should be twisted in the winding, the direction of the twist being against the line of the pull on the wire. —*Scientific American.*

IMPROVEMENTS IN STEAM HAMMERS.—Io Obemnitz, the great tool-making center of Germany, there have been made some improvements in steam hammers that are worthy of notice and in keeping with the tendencies of other steam machinery of our day. The hammers have two cylinders and two piston-heads of different area, that operate on the principle of a differential engine; the steam, acting first in the same cylinder to raise the hammer, is then exhausted into the large cylinder, to make the down or working stroke. Heretofore steam hammers have been wasteful machines, the steam being used without expansion and the "clearance" in short strokes being lost. The differential plan seems a good one, if there are also arrangements to use initial steam both above and below the pistons when required. —*Industry.*

UNITING ALUMINUM TO GLASS.—A Cincinnati expert, it is said, has succeeded in uniting aluminum with glass. If this be true and can be practically done, it promises to make a great revolution, especially in the construction of incandescent electric-light globes. It has been the study of scientists for years to find a metal which would unite with glass in which the contraction and expansion were equal, and as far as nothing has been found available except platinum, the cost of which is enormous and the supply limited. It is therefore with a great deal of interest that the development of these experiments will be watched, and it is to be hoped that something has at last been found which will in every sense of the word "fill a long-felt want."

A HINT FOR A FOREMAN.—One of the good points that should be seen in a foreman is the ability to look ahead and see what is coming and have all the difficulties provided for as fast as they appear. It is something like a man laboring under a heavy-loaded wheelbarrow; you can help him about as much by knocking out the little trigs and obstructions that are likely to come before the wheel, so as to make it all smooth work for him, as you can by seizing hold of one arm of the barrow and rushing recklessly over everything by main strength.

SOLDERING ALUMINUM.—It is costly work to solder aluminum, for the parts must be sweat full of gold first before the solder can be made to take hold.

SCIENTIFIC PROGRESS.

The Obliquity of Planetary Orbits.

In an article in a recent number of *Nature*, the opinion is expressed that "the only plausible hypothesis to explain the inclinations of the axis of planets upon their orbits" is that at some time they have been struck by comets. A correspondent of the *Scientific American*, in commenting upon that theory, says: "The writer, no doubt, infers this from the ring theory of Laplace. If the sun, at the time of the formation of a planet, were a perfect sphere, it is difficult to see how the planet could be formed, by natural causes, in any other way than as a ring. But was the sun a sphere? It seems to me much more probable that, during its nebulous state and during the generation of the planets, the sun was an irregular mass of vapor, some parts being more distant from the center than others. Such higher parts, situated toward its equator, but not necessarily in it, would have a greater velocity than the general surface, and thus would be compelled by centrifugal force to separate, one after another, from the main body, to become planets.

"If this be so, they were thrown off, not in rings, but in masses, the largest ones first, as on the separation of each one the sun would become more regular in form and the protuberances smaller. These bodies, thus torn from the main body, would not be likely to assume revolution on axes exactly perpendicular to their orbital motion, and I would thus account for the obliquity of their orbits. In the meantime the parts of the sun toward its poles, having less rotary velocity than the equatorial parts, would fall more rapidly toward the center, and thus contribute to its spherical form.

"There is no sign anywhere of ring planetary formation, unless in the case of the rings of Saturn, and perhaps that of the asteroids, which may be fragments of a broken ring. But we see that in neither of these cases was a globe the result."

In reply to its correspondent, the editor of the last-mentioned journal says:

This theory is fully as plausible as the one advanced by Leontar in the article on "The End of the World," in our issue of Oct. 4. Yet both, being of accidental nature, do not accord with the uniformity of axial and orbital inclination of every individual body forming the solar system, the only exception being the system of minor planets, which seem to be the remains of an accident to some large planet originally occupying a normal place in our system. The axial positions and orbital relations of all the bodies of the solar system, from the sun to the remotest planet, seem to be due to the slight perturbations from the irregular flight of comets, meteors, and of interplanetary gravitation through the vast myriads of years that have elapsed since the dawn of their individualities.

ARTIFICIAL MUSK is a recent chemical achievement, a process for its production having recently been patented in Germany. It appears in crystals of a yellowish-white color and of a strong musk odor. For perfumery purposes the crystals should be dissolved in alcohol, with the addition of a trace of ammonia or carbonate of ammonia. This solution, which may be compared to tincture of musk, surpasses the latter in the intensity and penetrating power of its odor. The product to be used in perfumery must previously be diluted in a homoeopathic manner. The following are the rather loose details of the manufacture of the article, which have been deposited in the German Patent Office: "Boil in a reflux condenser toluol or toluene, C_6H_5 , with one of the following halogen compounds of butyl, viz., chloride, bromide, or iodide of butyl, along with chloride or bromide of aluminum. The resulting product falls back into the water in the still, where it is decomposed and distilled in a current of water vapor. The parts which distill between 170° and 200° are collected separately and treated with a mixture of nitric and fuming sulphuric acid. The product obtained from this process is washed in water and redistilled in alcohol, from which the 'artificial musk' crystallizes out." The patent rights for France and abroad have been disposed of to a syndicate of manufacturing perfumers. There is no doubt that the trade in natural musk, so far as the perfumery branch is concerned, is threatened with a very serious crisis. The use of musk in medicine is very restricted, the article being now only employed in certain cases of typhus. This may be regarded as another of the triumphs of synthetical chemistry.

A NEWLY DISCOVERED PROPERTY IN COTTON-SEED OIL.—According to the *Scientific American*, Philip Helbig and Hermann Bertling of Baltimore have discovered a new property of cotton-seed oil, which seems likely to extend its usefulness considerably. One gallon of pure cotton-seed oil being placed in a suitable iron vessel, 20 pounds of lead are melted and slowly poured into the oil, which at the same time is thoroughly stirred. The lead separates in globules, and when the oil is poured off, after cooling, there is found to be about 17 pounds only of the lead, the balance having been absorbed by the oil. The lead is again melted, and the operation repeated to the fifth pouring, the amount of lead absorbed being less at each succeeding pouring, but the total

amount absorbed being about ten pounds. The oil thus charged with the lead is then used as a paint, and applied in the ordinary way to metallic surfaces, which it is desired to protect from oxidation or corrosion. It is said to adhere closely and become very hard. Other metals are said to be similarly absorbed by cotton-seed oil, but it is not thought that any other oil possesses the same property.

SINGULAR ELECTRIC EFFECT.—A peculiar and instructive accident occurred recently at a fire in Lynn, Mass. The electric station took fire while the steam engine was running and driving a large dynamo which sustained the electric lights of that city. The wires were soon cut off, and the engine thus suddenly relieved of its work in keeping up a powerful electric current. The 700-horse power engine immediately commenced running wild, with such speed as to at once burst a large fly-wheel into pieces, doing much damage. This occurrence affords an excellent illustration of the principle of the transformation of energy. The power of the engine, instead of being transformed into electricity, was suddenly changed into centrifugal force which manifested itself in the wrecking of the fly-wheel.

AN ANTI-FRICTION SCREW NUT.—An anti-friction screw nut has been invented in which the bearing pressure falls on steel balls rolling in grooves in the nut and the threads of the screw. In the case of vertical screws, the balls "circulate" by falling from the top to the bottom of the nut and make regular "trips." Considering the abrasive wear in case of much pressure, and the complication, we think these may safely be set against the friction in a wall-made square thread nut of the common kind. Ball bearings are a questionable expedient in any case, so are roller bearings of all kinds, where there is any considerable pressure, and any complete obliteration of the whole system would be no loss in the mechanical arts, except for grindstones. —*Industry.*

TWO IMPORTANT LITERARY FINDS.—The *London Times* of Jan. 18th announces that the authorities of the British Museum have discovered among the collection of papyrus rolls acquired recently in Egypt the text of Aristotle's treatise on the constitution of Athens, from which numerous writers of antiquity have quoted, but which hitherto has been known only in detached fragments. The discovery is most unprecedented in the history of classical learning. The *Times* adds that there is no doubt of the genuineness of the manuscript. Another recent and important discovery is a poem of the sixteenth century, which treats of the same subject as Shakespeare's "King Lear." It has been published by the Academy of Sciences of Cracow.

CHEAPER ALUMINUM.—Mr. Eugene H. Owles, president of the Cowles Electric Smelting & Aluminum Co. of Lockport, N. Y., has stated to a reporter of the *Sun* that their new process of electric reduction of pure aluminum directly from the ore has reached such a stage as to enable them to produce metal, 98 per cent pure, at a cost of \$1.25 per pound. It is proposed to utilize the entire Lockport plant for the production of aluminum by the new process, and the capacity of the works is estimated at from one-half to three-fourths ton per day. The production of aluminum in alloys of iron and copper will be abandoned at these works.

CHAIN MOTORS IN MINES.—One of the latest motors designed for coal mines obviates the disadvantages of the excessive weight of the locomotive needed to gain sufficient friction on stiff inclines, by having a continuous chain gear. The chain is fixed at each end of the gallery, and passes around the sprocket-wheel of the electric motor on the locomotive, thus hauling the train of trucks along. This arrangement has been found far more practical in special cases than the simple locomotive for hauling. —*Electrical Engineer.*

CHEAP PIG IRON.—The *Manufacturers' Record* has in its possession a report made by one of the leading members of the British Iron & Steel Institute, an expert of the highest standing, on an iron property in the South, which, he says, is more valuable than the Cornwall property of Pennsylvania or any of the Lake Superior ore properties. This report says that the ore can be mined for 30 cents a ton, and that pig iron can be made at that point for \$7 a ton.

INFINITESIMAL MEASUREMENTS.—Prof. Rogers, it is said, has succeeded in measuring changes in length in a bar of metal caused by changes of temperature, to the millionth part of an inch. The experiments were carried on at Waterville, Me., in the laboratory of Colby University, and the principle employed was by the employment of light, the wave lengths of which were measured.

IODINE, hitherto known in nature only in combination with other elements, is now found in a free state in the water of Woodhall Spa, near Lincoln, Eng. The water is colored a decided brown by the iodine.

ORRIS ROOT, from which all violet perfumes are derived, is devoid of odor when dug, and has to be dried in order to develop its qualities.

USEFUL INFORMATION.

BURSTING OF GRINDSTONES.—The bursting of grindstones is so common an occurrence that it is a matter of surprise that no attempt has been made to learn the cause, and it is only recently that any one has ventured to express an opinion. The investigations of Mr. McNiece, proprietor of a saw factory in Philadelphia, after witnessing many accidents from the bursting of the grindstones, bring him to the conclusion that it is due to the square holes cut through the center, as every stone that he has seen which burst had a square hole, while none having round holes ever burst, and many stones that were worn down have been examined, and in all cases cracks were found in the corners. It is evident that the stone, working loose on the shaft, bounds more or less from side to side, and eventually the stone cracks from the repeated blows. The square hole is not a necessity, and buyers of grindstones should refuse to purchase any with other than a round hole through the center. The stone can be secured on a round shaft just as firmly as it can on a square one, by the use of a slide washer and keys. Many persons are injured every year by stones bursting, and if, as appears, the result is due to the use of square holes, it is little less than criminal to have such stones and ask men to work on them.

THE SEALSKIN BUFFALO. made by crossing polled Aberdeen cattle on the wild stock, is said to have a fine, glossy fur, as beautiful as that of the seal, and much thicker. The hump on the buffalo almost entirely disappears on this cross, and with it the shaggy mane for which buffaloes have always been noted. There are now twelve of these seal buffaloes, and the cross promises to become a successful and valuable breed. They lose their wild traits and become as easily domesticated as are our common cattle under like circumstances. The Hudson's Bay Fur Company is giving up business because furs are no longer to be had, and the sealskin buffalo, many of which show fur marked like a tiger, will doubtless become a valuable product in northern climes, where the winters are too cold for the common breeds of cattle to succeed. The above crossing will no doubt yield a greatly improved fur—if far it can be called—but it will probably be a long time before it is recognized as a "sealskin."

ONE CENT POSTAGE.—A contemporary says: A good deal is said of the advantages that would result to poor people by reducing letter postage to one cent. It appears to us that the advantage is more apparent than it would be real. The great bulk of letters that go through the mails are from business houses. While plain John Smith would perhaps save 50 cents a year, his employer might save \$200. It appears to us that, if the Government gets too much revenue from its postal service, it would be better to improve that service, charging two cents for carrying a letter, at least for some years to come.

ANCIENT CHINESE MINERS IN INDIA.—An interesting discovery has been made on the Harn-hall gold mine in the Mysore, says the *Indian Engineer*. While sinking the main shaft, the workmen broke into an old shaft, dug perhaps a thousand years or more ago. There were found mining implements of various kinds used by the ancient workers. It is supposed the workings were made by Chinese, of whose presence in Mysore there is unmistakable evidence. The tools found are said to be very like those used by the Chinese and unlike anything known to be used by Hindus.

EXPENSIVE DOG FLESH.—A Pittsburgh dispatch of Jan. 22d says that Count Nohle, the famous Eogliah setter, by Nora and Count Windom, is dead. His owner, B. F. Wilson, had several times been offered \$10,000 for him. The next most precious bit of dog flesh, which has recently been announced, is about leaving England for America. The noble animal is the St. Bernard, Sir Balvidere, sold by T. H. Green to E. B. Sears of Boston for \$6500. This dog has not as yet left a prize untaken.

A NEW "SPELLING."—The word "gauge," so much used in engineering and technical literature generally, will hereafter be spelled "gage" in the columns of this journal, following the authority of the Century Dictionary and the usage of the *Century Magazine*. We advise all our readers to go and do likewise.—*Engineering News*.

OLEIC ACID.—An acid which seems to have a peculiar solvent action upon the oxides, and yet leaves the metallic surfaces intact, is oleic, and when combined with finely powdered Venetian red and cleaning fluids, it leaves no trace of the desired in cleaning and polishing brass.

THE LARGE FISHING BANK recently discovered in the Pacific ocean, a short distance off shore from Point Loma, San Diego, is proving of great value. Some fine catches of whitefish and rock cod have recently been made there.

It requires about three seconds to transmit an electrical signal through the Atlantic cable.

Sweden has a machine that makes 1,000,000 boxes of matches daily.

ELECTRICITY.

Frictional Electricity.

The boy who desires to experiment a little in frictional electricity can obtain considerable experience and dead loads of fun, with so simple an electrical outfit as one chair, four tumblers, a smaller boy and a house cat. Place the tumblers on the ground, the chair-legs in the tumblers, set the boy on the chair and let him hold the cat. This part must not be omitted; it is the most important part of the whole experiment, and if the boy does not hold the cat he will be sure to come up to the scratch.

See that the hands are dry and clean; stroke the cat carefully from head toward tail, then remove the hands and apply again for another stroke, taking care not to rub the wrong way. After making a dozen strokes, a person applying the knuckles to either the boy or the cat will receive a smart discharge of electricity. The flesh of the boy acts somewhat like a Leyden jar, and high-pressure electricity is stored up to a considerable extent.

A sharp sound accompanies the discharge, which feels like the pricking of a pin, both where it strikes the hand and where it leaves body of boy or cat. When ready to terminate the experiment, make several elaborate passes over the cat, work up a powerful storage of electricity, then apply the knuckles suddenly to pussy's nose. The experiment terminates very suddenly at this point: Pussy decidedly objects to this part of the proceeding and the boy objects to further holding the cat.

ELECTRICITY IN VOTING AND COUNTING.—The plan of voting in assemblies by means of the electric current, and thus avoiding the time lost in making divisions, has been before the French Chamber of Deputies, and a report on the subject has been presented by M. Montaut. In that report the advisability is recommended of employing a machine which would indicate not only the total votes, the "ayes" and the "noes," but also the number of voluntary absentees from voting, as distinct from the number of absentees. Such an apparatus has been devised by M. Le Goazion. On every desk in front of a member is placed a small box fitted with two handles, which the member works when registering his vote. The right handle registers his "aye" and the left his "no," and both moved simultaneously indicate his absence from voting. The results are printed by means of electro-magnets in a receiver, and are visible at a glance. Provision is made for a member to recall and correct his vote during the time allowed for the purpose. An electrical device has also been in operation for some time in Washington, which was made in Austria and which is called a tabulating machine. It is used in the Census office, to aid in tabulating census statistics.

A MAGNETIC LIFT.—A party had on exhibition at the late Pittsburgh Exposition an electro-magnet designed for lifting pig iron from the pig bed in the cast house, which had a lifting capacity of 7200 pounds. In shape it somewhat resembled a bell with nearly vertical sides, standing about 20 inches in height, and measuring about 24 inches across the bottom. The thickness of the sides of the bell, if it may be termed such, is about three inches, and within the bell and being flush with it at the bottom was a large coil forming a powerful electro-magnet. The coil is made a magnet by the passage of a current of electricity through it. The magnet, which is attached to a crane, can be raised and lowered. The load can be dropped by simply shutting off the current.

THE WESTINGHOUSE ELECTRIC CAR.—The recently-introduced Westinghouse car, with its smooth and comparatively noiseless running, has created quite a favorable impression in electrical circles. The performance of these cars on the line lately installed, that at Greenburg, Penn., is a confirmation of the creditable record first made by them. In covering a distance of two and one-half miles the cars had to climb no less than eight hills, the majority of which had grades of 10 per cent. In addition to the hills the line had a large number of curves, all about ones, and two of a radius of 50 feet. In spite of these obstacles the operation of the car is reported as being easy and smooth and thoroughly satisfactory in every respect.

A CONVENIENT ATTACHMENT.—A brougham recently built by an English firm "adapts" electricity in rather an ingenious way. It is fitted with electric light sufficient for reading or writing. Opposite the seat is an ivory plate, on which are several buttons properly lettered: "Left," "Right," "Stop," "Go On," "Home," and so on. On the dashboard, in the coachman's view, is a case lettered to correspond, so that when a knob is pressed he understands at once what is expected of him. One button brings out the word "Speak," in which case he will put the speaking-tube in position and receive orders.

TRAINS MOVED BY ELECTRICITY. running under the Thames and connecting parts of London—moving at a speed of 25 miles an hour—rather puts us to shame in the matter of rapid transit. Yet we laugh at the slowness of our English friends in adopting the use of electricity.

SHOP NOTES.

How to Use Glue.

All the glue as received from the factory requires the addition of water before it will melt properly, and every addition of water (while the glue is fresh made) will, up to a certain point, increase the adhesiveness and elasticity, and it is the duty of every man who uses glue to find out just where the point lies, as it is possible to melt glue and have it so thick that after it is dry, or set, it will be so brittle as not to adhere to the wood. Some glue will bear more water than others, but all will bear more than usually falls to their share, and that, too, with a greater increase in the quality of the work. For glue to be properly effective it should penetrate the pores of the wood, and the more a body of glue penetrates the wood, the more substantial the joint will remain. Glue that takes the longest to dry is to be preferred to that which dries quickly, the slow-drying glues being always the strongest, other things being equal. For general use no method gives such good results as the following: Break the glue up small, put into an iron kettle, cover the glue with water and allow it to soak 12 hours; after soaking, boil until done. Then pour it into an air-tight box; leave the cover off until cold, then cover up tight. As glue is required, cut a portion and melt in the usual way. Expose no more of the made glue to the atmosphere for any length of time than is necessary, as the atmosphere is very destructive to made glue. Never heat made glue in a pot that is subjected to the direct heat of the fire or lamp. All such methods of heating glue cannot be condemned in terms too severe. Do not use thick glue for joints or veneering. In all cases work it well into the wood in a similar manner to what painters do with paint. Glue both surfaces of your work, excepting in case of veneering. Never glue upon hot wood or use hot coals to veneer with, as the hot wood will absorb all the water in the glue too suddenly and leave only a very little residue, with no adhesive power in it.

HARDENING IRON.—Oil hardening seems to be one of the best ways of handling heavy work. The tank into which hot gun steel is plunged contains 1200 barrels of oil. When the oil takes fire, shut down the cover just as you would a tank on a small scale. Experiments are being made in hardening heavy work by a process that is made use of in France. A metallic liquid is used that will absorb the heat at a great rate without generating steam or vapor to keep it from coming in contact with the steel, or giving off fumes that are poisonous. Among the old suggestions that were offered a hundred years ago, in regard to hardening steel, was one which said: "Heat your steel and plunge it into wine into which the root of blue lilies has been soaked, and it will be made very hard. If bean water is used instead, it will be made as soft as lead."

SHOP HANDS.—A shop where all hands seemed to regard each other as men would be an interesting place to visit, but we do not expect to find anything of its kind this side of the next world. If a man gets hurt and is laid up for three months, the boy will take right hold and patch up a goodly sum to help him along, but if he cuts off a finger or smashes his thumb, they will all take a look at it and go back to work saying, "good enough for him, always into something that didn't concern him," "can't mind his business, and had to fool around that saw," or "served the cuss his lesson that time; guess the boss won't run on to my job again." And all hands settle down to making life unpleasant for some other poor chap who would gladly meet half-way in good-fellowship his comrade toilers.

HARD AND SOFT EMERY WHEELS.—Hard, close-grained emery wheels do not cut so rapidly as soft, loose ones, from the fact that the particles in the hard stone are more compact, and the edges wear slightly before breaking, while in the soft wheel the cement wears first, and more rapidly, presenting new cutting edges to the work, which, when but slightly worn, will pull out of the wheel on account of this increased friction surface, fresh, sharp edges replacing them. This is proved by the fact that the fastest-cutting wheels are the softest.

A NEW METHOD OF DEVELOPING MINES.—The Industrial Mining Co. has been incorporated with headquarters at Jackson. The directors are William Moon, Joseph Moon, James Moon, George McConnell, W. E. Lawrence, W. H. Griswold, and Richard Moon. It proposes to develop the mines of Amador county on the co-operative plan. The value of shares is \$12 each, \$1 payable on the issuance of certificate of stock, and the balance in monthly installments of one dollar. When the full price is paid the holder of the paid-up stock becomes a member during the life of the incorporation, and is not liable for any further payments. Only a limited number of shares can be held by one party. The money is to be used for labor in developing the mines, and members are to have the preference as employees. The plan is being canvassed in Chicago and other places, and encouraging reports of the prospects of placing a large block of the stock in the Eastern money centers are being received.—*Amador Ledger*.

STEAM BOILER NOTES.

The Serve Ribbed Boiler Tube.

The *Engineer*, of New York, has this to say about the Serve ribbed boiler tube that has recently been tested in England:

"The Serve boiler tube, so called from its inventor, has ribs projecting internally for its entire length, and it is intended to increase the evaporating power of the boiler by augmenting the internal surface exposed, and its conductivity. This seems fallacious, for the capacity of the tube is bounded by its external surface and it can give no more than can be radiated by a given surface in a given time. Otherwise such tubes are objectionable, by reason of the impossibility of cleaning them, and by cinders or small coal getting between the ribs and choking the tubes."

Commenting on the above, the *Boston Journal of Commerce* says:

We would like to inquire how much radiation from tubes has to do with making steam in a boiler? How much a tube will radiate has little to do with the matter. Water in a boiler is heated by convection and the heat given it by radiation from the tubes isn't worth considering, so the capacity of a boiler tube is not bounded by the amount of radiation. Nor is the idea of the Serve tube fallacious, for the water being heated by convection, it is the internal surface exposed and the conductivity of the metal that is to be considered. The external surface of the tube will give more heat to the water where the tubes project, simply because its internal surface gives it more heat. So long as the ribs keep the same temperature as the water, the water is taking the heat. With steel ribs this will be for a less distance than with copper, for instance, that would conduct heat to the external surface more rapidly. Any one can see a demonstration of the truth of this by watching the water boil in a kettle with short projections upon its bottom to rest upon. The water will boil first over these projections and continue to boil there after it has ceased everywhere else in the pot.

THE FUTURE OF THE STEAM ENGINE.—Is a recent issue of the *North American Review*, Prof. R. H. Thurston, of Cornell University, an authority on the subject of steam engines, expresses it as his opinion that this invention is capable of vast improvement, and that it has not yet begun to exhaust its inherent powers. On the basis of greater developments in the application of inventions to the steam engine, Professor Thurston predicts that the next generation will see it consuming one pound of fuel per hour for a single horse-power; that ships of 20,000 tons will be driven at the rate of 40 miles per hour; that the American continent can be spanned by flying trains in two days, and that transportation between the cities of the Atlantic and those of Pacific coasts will be so cheap that the general average of living will be vastly improved upon what exists today.

STEAM ENGINEERING.—One of our contemporaries rightly observes that radical changes in the science of steam engineering have not been numerous in the last quarter of a century, but improvements in the details of construction and operation have been many and of high utility. How important this progress has been in its economical results is indicated by a statement recently made that railway trains in England are now driven at an average speed of 14 per cent higher than 20 years ago, with a little more than half the quantity of coal.

HEATING SURFACES.—It has been found by experiment that nothing is gained by having a higher ratio than 36 to 1 of heating to grate surface. Up to a ratio of 45 to 1 there is no appreciable loss but no gain, and above this there is a clear loss.

Golden Fruit from a Golden Soil.

Smartsville, Yuba county, sent 25,000 oranges as its contribution to the exhibits of the Northern Citrus Fair at Marysville, and carried off several prizes. This old mining camp, which has yet a great store of gold to be taken from its gravel channels, is also capable of competing, by its golden fruit grown on the surface of the mines, with famous orange-growing districts of Southern California.

The old idea that mines of gold and silver were only found in regions fit for nothing else, was exploded when we began to realize the capabilities of the soil of this Golden State. It is true that most mining regions are not attractive in their surroundings, and few are fruitful in sight but mineral wealth. But in the gold-producing counties of this State the miner can be farmer, and the farmer miner as well. The surface of the soil may be cultivated for fruit and cereals, and under the golden grain may be found. In numerous places both mining and farming are carried on upon the same "claim" or ranch.

Smartsville was one of the famous hydraulic mining camps, but its glories departed when that branch of mining was stopped by the courts. There are many acres of auriferous gravel still unworked in its vicinity, and in due time, when a plan is devised to permit these deposits to be again worked, the old camp will see a revival. Meantime the fruit-growers are busy in their vocation, and the auriferous soil returns a golden yield in another form.

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SAN FRANCISCO:

Saturday, February 7, 1891.

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Business Announcements.

[NEW THIS ISSUE.]

Keystone Boiler Works—Hamilton & Leach.
Belting—Alex. Hoins.
Assessment Notice—Gray Eagle Mining Co.
Dividend Notice—Pacific Coast Borax Co.
See Advertising Columns.

Passing Events.

The announcement that deep mining will again be resumed along the whole line of the Comstock lode will be received with gratification by all who have abiding faith in the riches of that wonderful vein. The lower levels have been abandoned for five years, but they will now be drained and men set at work prospecting for ore bodies. Active operations will be commenced at once, and all the pumps set at work. Some hundreds of additional men will find employment on the Comstock as soon as the lower levels become accessible.

It looks now as if San Francisco alone will be unable to do as it pleases in the matter of electric roads. The cities of the second and third class will doubtless be permitted by the Legislature to have overhead-wire railroads if they wish them, but it seems San Francisco will not unless the representatives at Sacramento change their minds by Monday next.

Considerable prospecting for coal is now going on all over the coast. The scarcity of good coal in California is greatly to be regretted, but even that of inferior quality pays very well for local consumption, so that the owner of a coal mine generally has a good thing of it.

Deep Mining on the Comstock.

About five years ago the lower levels of the Comstock mines were abandoned and allowed to fill with water, but it is realized now that this never should have been done. The men who control the south end and Gold Hill mines began to drain the lower levels of their claims some months ago through the Crown Point incline. Now the men who control the middle and north end mines have decided also to do some deep mining again themselves.

This announcement has been hailed with joy on the Comstock, for it means renewed life to that famous mining region. The great Combination shaft, owned by the Chollar, Potosi, Savage and Hale and Norcross Mining Companies, was the last of the deep shafts on the Comstock to shut down when deep mining was abandoned. It was shut down early in 1886, and great gloom immediately fell upon Virginia City and Gold Hill, and upon the mining and stock interests generally. Thousands of men were thrown out of employment and the stock market fell to very low prices. Mr. Alonzo Hayward, one of the mining magnates who control the middle and north end mines, says: "The first step we shall take will be to start Cornish pumps in the Combination shaft and lower the water until we can recover the hydraulic dumps and set them going. This will drain the lower levels of all the middle mines, and also help drain the Gold Hill and north end mines. When this work has got well under way you may learn that the pumps at the C. & O. shaft are to be started. We have, in fact, a plan for the drainage of the whole lode and are going to carry it out. We are encouraged in this matter by recent discoveries of ore which have been made in the mines."

This means a resumption of deep mining along the whole lode, and will result in the employment of many more men. When the hydraulic pumps in the Combination shaft are reached, they will be set at work, and then the pumps at the C. and O. shaft will be started up. When the lower levels become accessible, prospecting operations will at once commence. It is probable that expenses will be reduced in other directions so as to prosecute the deep mining. There are thousands who have faith in rich ore in the lower levels, and who have never abandoned that faith even while work was stopped. The old Comstock has seen hard times in the past few years, but may again retrieve itself. There are 49 different mining corporations on the Comstock, and since their incorporation the combined number have levied assessments to the amount of \$77,920,385, and have declared dividends to the amount of \$120,558,780, leaving a balance in favor of the mines of \$42,638,395 over and above the assessments. Over \$520,000,000 of gold and silver has been taken out of the Comstock in the last 30 years.

Copper.

The California product of copper amounted last year to about 2,000,000 pounds, a quantity that it is calculated will be more than doubled the present year. The only mine in the State that is making any considerable output of this metal is the Union, at Copperopolis, lately restored to a productive condition, and which is now being actively and profitably worked.

"The value of copper during this year will depend mainly upon the extent of the supplies received from the United States." So say James Lewis & Sons of Liverpool, the authorities on copper statistics, proving that the United States, and not Chile, control the copper market. No reason is seen why the consumption of copper during 1891 should be less than in 1890. In fact, it appears likely to prove greater with the constantly increasing use of electricity for lighting, motive-power, telephonic and telegraphic purposes, a probable increased consumption of sulphate of copper, and an improved demand from India. It is thought that about 50,000 tons more copper will be required in England and France during 1891.

Last year the increased production from the United States was 17,000 tons of copper, 6000 from Lake Superior, 1600 from Arizona, 8000 from Montana and 400 from other States, but the consumption increased 20,000 tons. Allowing, therefore, for an increased consumption in the United States, chiefly in the form of copper for electrical purposes (especially for motive-power, railways, etc.), there seems but

little probability of sufficient copper coming from this country to provide for the estimated foreign deficiency of 40,000 tons, and maintain English and French stocks at their normal level of 50,000 tons.

The statistics of 1890 show a decreased import into England and France, and English production, as compared with 1889, of 1069 tons, and an increased consumption in, and exports from, England and France of 28,864 tons. English consumption shows an increase of only 411 tons, but the exports from England an increase of 14,120 tons, of which 11,063 tons were of English copper to France, while French consumption has increased to the great extent of 25,396 tons. Whereas the imports from the United States to England and France show a decrease of nearly 10,000 tons, that from Japan shows an increase of 8,000 tons, and from Spain and Portugal 1500 tons. From the Cape there is a decrease of 1500 tons, and from Quebrada an increase of 1000 tons. With these exceptions, there has been but little change in the quantities received from the different countries.

It is estimated that the increased production of sulphate of copper absorbed fully 15,000 tons more copper in 1890 than in 1889. The total copper production of the world for 1890 is estimated at 282,000 tons, against 265,000 in 1889 and 260,000 tons in 1888.

Borax.

The quantity of this salt manufactured on the Pacific Coast last year—all in California and Nevada—amounted to 6000 short tons (12,000,000 pounds). The borax industry, which for many years suffered severely by reason of excessive local competition, has, for the past year or two, proved more remunerative; the several producing companies having come to work more in harmony. As a result the market has been kept at paying prices, which may be quoted at seven cents per pound for concentrated and eight cents per pound for powdered and refined, these being wholesale rates.

California and Nevada are the only States which produce this salt, and they are also the only counties on the western continent that produce it to any considerable quantity. The beds have been worked for about 30 years, and at one time the business was so overdone as to bring disaster to the investors. The remoteness and desert character of the region where the ore material occurs and where its manufacture is carried on, cause the work to be carried on at somewhat heavy expense.

For some years there has not been much profit in the fields owing to depression in prices. At one time, years ago, borax was sold for 35 cents a pound, and now it is even cents. In May, 1887, it was down to five cents, and in 1886 even lower than that. Competition with the foreign article, and competition between themselves, caused the companies to lose money.

Affairs are better now, however, and there is an increase of production shown. Back in 1879 the production was only 1,500,000 pounds; in 1886 it was 9,778,290 pounds, and the past year about 12,000,000 pounds.

JOHN KELLY, the well-known mining superintendent and stock operator, died of consumption in this city on Thursday. He was originally a miner in the early days of the Comstock, and made quite a fortune in the palmy days of Crown Point and Belcher. This he lost and went to work in the Belcher again, but subsequently retrieved his fortunes. He was at one time superintendent of the Lady Bryan. Of late he has been at Bodie, and was for some time superintendent of the Bodie Con. Mono and Bulwer Con. mine. He is reported to have left an ample fortune for his wife and two children.

THE Mechanics' Institute Nominating Committee have reported the names of Irwin O. Stamp, George E. Dorr, Samuel J. Hendy, Oscar Lewis, M. A. Dorn and Andrew Wilkie for presentation to the members at the next election of directors.

WORK has been commenced on the new electric road of the San Francisco Syndicate and Trust Co. This will be the first electric road in San Francisco, and will be two and one-half miles long.

THE owners of a mine on White river, Tulare county, crushed 12 tons of rock last week, and got \$1000 worth of gold.

The Bear Valley Dam.

(Continued from Last Week)

The new dam will be 15 feet thick on top at the water-line, and will carry a heavy wall acting as a wave parapet on the upper edge, and a heavy iron railing on the lower edge, and between these there will be a wagon-road. The back of the dam, or the side next the water, will be vertical from top to bottom, and the face, or lower side, will be built in the form of steps or terraces. These steps will have a uniform raise of ten feet, and each one will have an offset proportioned to the depth of the water above it, and just sufficient to prevent any tensile strains in the masonry when the reservoir is full of water.

The copy of the strain-sheet which is here presented (Fig. 3) shows the exact dimensions of the dam from the water-line down to the level of the datum plane, and it also shows the direction, theoretical point of application, intensity and resultant of all the forces acting on the dam, and shows the maximum strain in the whole structure when the reservoir is level full of water to be less than 12 tons per square foot. It also shows that the average pressure on the whole base will be less than six tons per square foot, and that there will be no tensile strains in any part of the dam.

Fig. 4 shows the ground plan and the cross-section of the dam taken through the middle of the gate-well. As will be seen from this cut, the gate-well is a cylindrical chamber extending from the top of the dam to a point a little below the level of the datum plane. It will be built into the back of the dam, as shown on the ground plan, and will be 18 feet in diameter inside. It will have three inlets at the bottom, four more 40 feet higher, and three more 40 feet higher still, or 80 feet from the bottom. The outlets will consist of three cast-iron pipes, 36 inches in diameter, laid on parallel lines and extending from the gate well out through the body of the dam. The inner ends of these pipes will be closed by massive gates worked by screws and rods extending up to the top of the dam, and operated in a gate-house which will cover the mouth of the well. These three outlet pipes will be capable of discharging about 75,000 miner's inches of water.

Fig. 1 is an enlarged plan of the well and outlet and inlet pipes, and Fig. 2 is a cross-section through the bottom of the well, showing the gates and lower inlet pipes; as will be seen, these inlet pipes are elbows with their mouths turned upward. The mouths of these pipes will be fitted with bronze rings to prevent corrosion, and whenever it becomes necessary to repair the main gates the inlets will be closed with cast-iron caps having gaskets under them, and the well will then be drained. Workmen can then go down and repair or remove the gates without difficulty.

The caps will be lowered by chains, as shown in Fig. 2, and will be provided with guides to steer them into position. When not in use they will be hauled up and stored in the gate-house. When the inlets are once capped and the well drained the pressure on the caps will be so great that no ordinary appliance would lift them off again until the well is filled; for instance, when the reservoir is full and the well empty it would take a twenty-four ton lift to raise the cap from one of the lower openings. To obviate this difficulty each cap is provided with an auxiliary valve, to which the lifting chain is attached. The first effort to remove the caps will open these valves and allow the well to fill with water, after which the caps will come off easily. Fig. 2 shows one of the caps suspended by its chain over the opening.

The dam will be 80 feet through at the bottom, and built of solid granite masonry laid in Portland cement mortar. It will be built on the solid rock, and the foundations will be out in steps, as shown in Fig. 2, so as to give the masonry the best possible hold on the rock and avoid any long-continued seams in any direction. The tops of the steps on the outer face will be finished with a cut granite coping 18 inches thick. These coping stones will average about 5 by 7 feet on top, and will be laid with close joints not exceeding $\frac{1}{4}$ inch apart, and they will be joined together with cast-iron dowels having swelled heads.

After the stones are placed in position, the holes in which the dowels are set will be filled with melted sulphur, so that no stone can be removed without breaking it in pieces. Great

care will be exercised in selecting these coping stones, and only the choice stones of the whole quarry will be used for this purpose.

The dam will be built in the form of a curve or horizontal arch, with the convex side upstream, as shown in Fig. 4. The crooked lines in the figure are contour lines joining all points of equal height, and their relative altitudes are given in figures. A little study of these lines will show that the dam can be built on this

they will be equipped with a full complement of air-drills and bolting and loading rigs. The quarries will be connected with the dam by railways carrying cars propelled by electric motors. At the dam the rocks and other materials will be handled by a new system of hoisting apparatus.

This will consist of four large steel cables spanning the gulch like the main cables to a suspension bridge. These cables will be drawn

across the canyon the whole length of the main cable. Two winding-drums will be required for each trolley—one to raise the load and one to move it along the cable.

These four rigs will each be capable of raising and moving a block of stone weighing ten tons, at a speed of 45 feet per

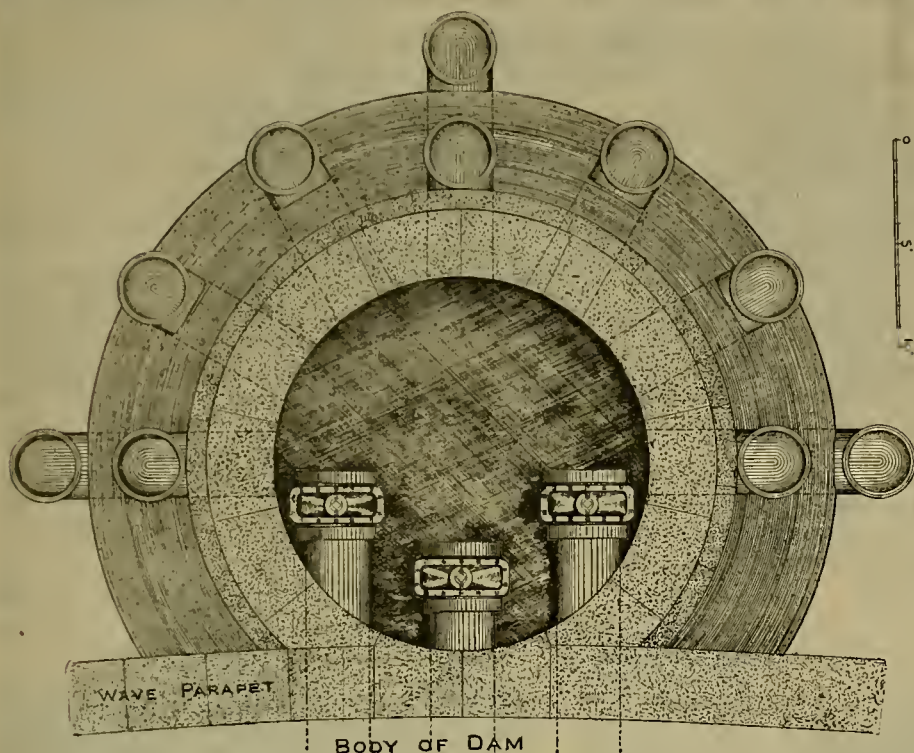


Fig. 1—PLAN OF GATE WELL.

site, with the curvature shown, with less material than it could if it were built straight or with any other curvature. The curved form will add greatly to the resisting power of the dam, especially during an earthquake. It is believed that when the dam is constructed as proposed, and the reservoir is full of water, it will be in a much better condition to safely resist a heavy earthquake shock than will any large building in California, and that it will be fully equal in security to any similar structure in the world.

Quarries will be opened on either side of the canyon within one-fourth mile of the dam, and

up tight and parallel, and so spaced as to cover the entire work. The cables will hang free from end to end, and each one will carry a small car or trolley, which will be free to roll along the cable from one side of the canyon to the other.

These trolleys will be rigged with hoisting pulleys under the main cable and a double block running to the load to be moved. These pulleys will be so strung that the load can be picked up to any desired height, the brake of the hoisting-drum set, and then the trolley, carrying its load with it, without either raising or lowering, will be free to move back and forth

minute, and can pick it up from any part of the work and set it down vertically over any other part.

They will be set up high enough at first to build the dam to 80 feet; by that time they will be worn, and will then be replaced with new ones high enough up to finish the work.

By this arrangement the slow-going derricks will be dispensed with, and there will be no gnysnor beams swinging round in the way to obstruct the work; and there will be no moving of derricks with its attendant delay and danger.

The tracks from the quarries will run under the main

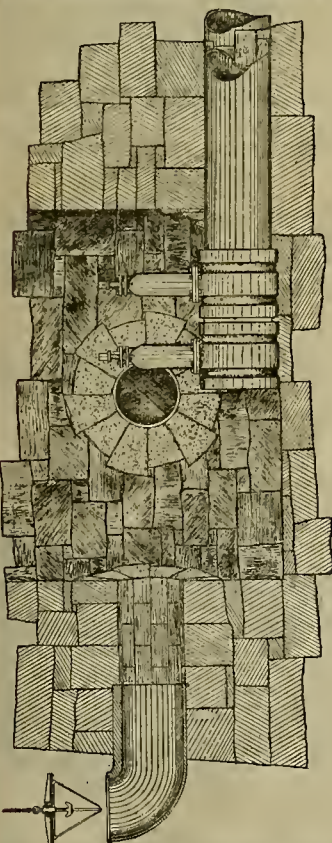


Fig. 2—SECTION THROUGH LOWER INLET.

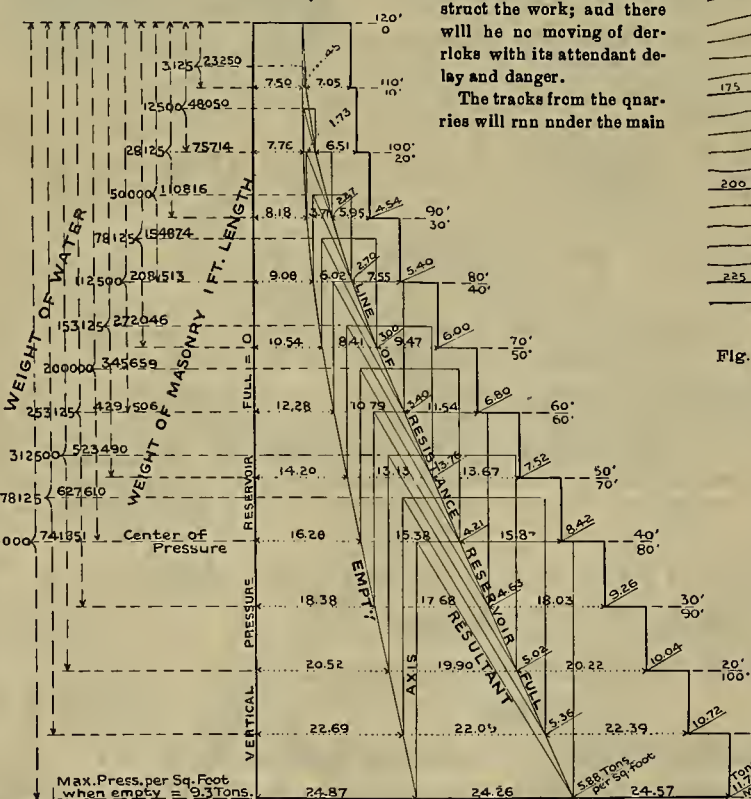


Fig. 3—SECTION OF DAM, SHOWING STRAINS AND DIMENSIONS.

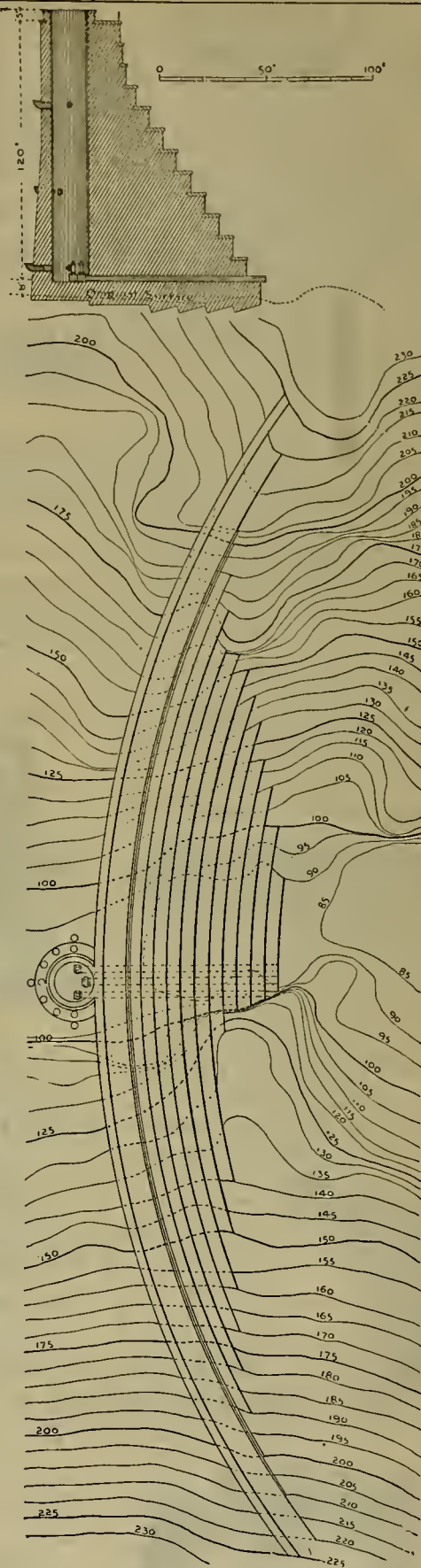


Fig. 4—PLAN AND SECTION OF NEW DAM.

cables, so that heavy rocks may be taken by the trolleys direct from the cars to their permanent position in the dam.

The mortar and concrete will be mixed by a rotating machine located under one of the main cables. This machine will discharge into iron kishies, and these will be lifted by the trolleys and conveyed directly to the mason's hand.

The cement, sand, broken stone and gravel will be stored in bins discharging into a hopper above the mixing machine. The hopper will be kept charged with the various materials in the right proportion. When a batch of cement is required, the hopper will be emptied into the mixer; the right quantity of water will be admitted, the machine will mix and empty its charge, and in from four to six minutes from the time the order was given the trolley will have a batch of fresh concrete at the mason's elbow.

(To be Continued.)

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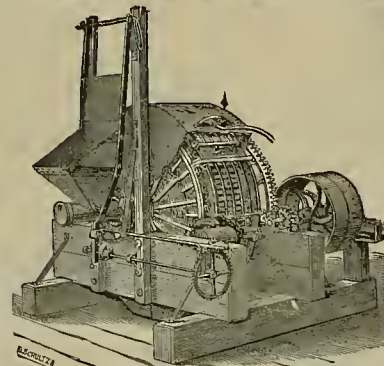
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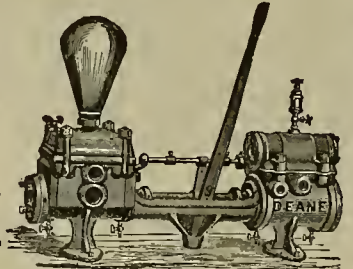
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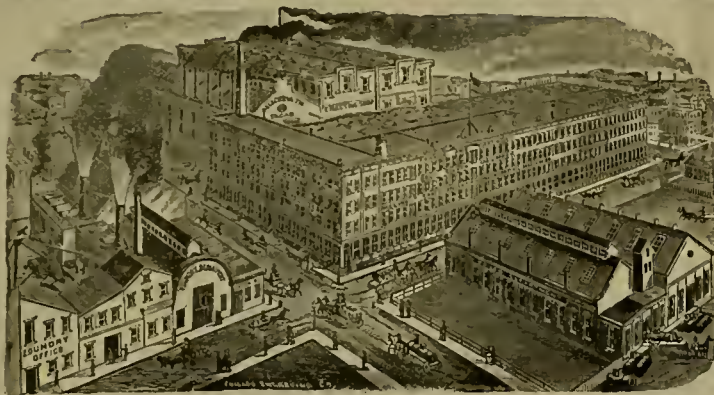
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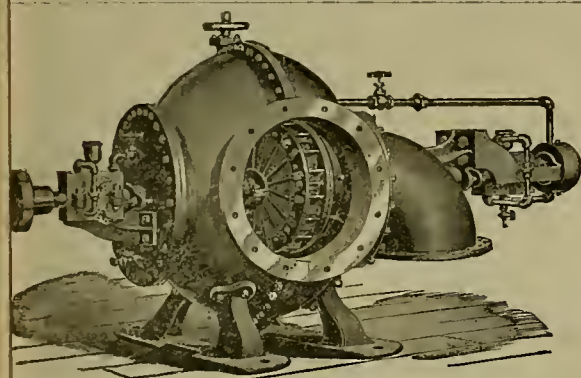
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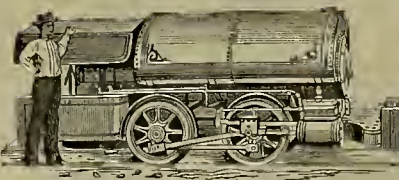
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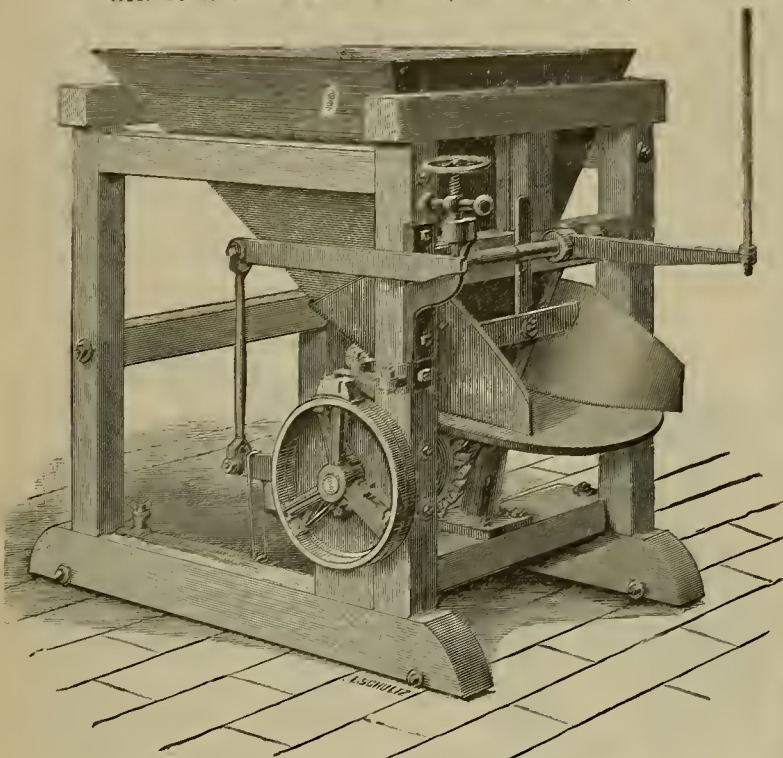
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AMALGAMATING MACHINES, CASTINGS AND FORGINGS OF Every Description

ALL WORK TESTED AND GUARANTEED.

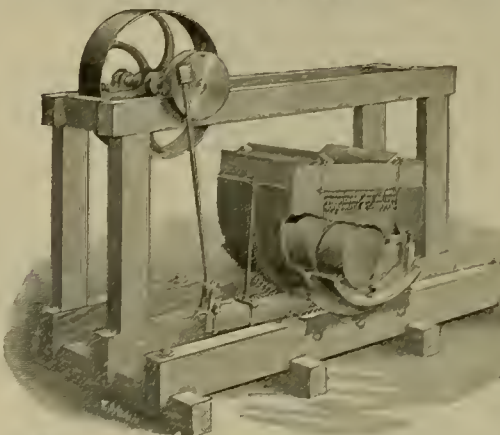
IMPROVED PORTABLE HOISTING ENGINES.

NATIONAL ROCKER QUARTZ MILL.

KENDALL'S PATENT, AUGUST 24, 1888.

CAPACITY, 12 Tons in 24 Hours. 2 H. P.

MARSHUTZ & CANTRELL, Sole Manufacturers.



The Patentee and Manufacturer cordially invite miners to critically examine and pass judgment upon this improved system of rolling and amalgamating ores in the following particulars:

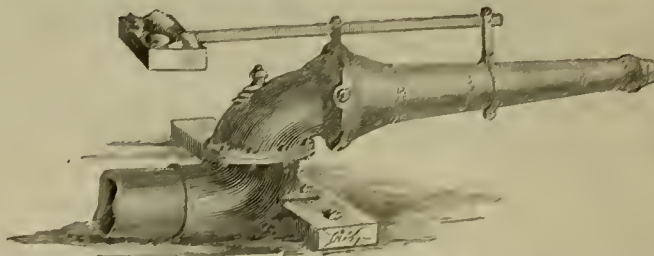
1. The cost is less than one-half of stamps of same capacity.
2. The height to mine is less than one-half of stamps.
3. The cost of erecting is less than one-fourth of stamps.
4. The power to drive it is less than one-half of stamps.
5. The wear is less than one-quarter of stamps.
6. There is no wear except on shoes and dies.
7. In point of amalgamation it is superior to any other machine in use.
8. In simplicity of construction.

We challenge competition with Stamps, Ball Pulverizers or any other ore crushing machines now before the public.

Send for Circulars and Price List.

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THE ABOVE CUT ILLUSTRATES THE IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture. We guarantee purchasers of this form of Giants against all costs, expenses or damages which may arise from any adverse suits or actions at law. We are further prepared to furnish Single-Jointed Giants when required. Prices, discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent on application.

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ROCK DRILLING, AIR COMPRESSING,
 MINING AND QUARRYING

MACHINERY,

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FRISBEE-LUCOP MILL CO.,

—MANUFACTURERS OF—

Centrifugal Roller Steel Mills,

FOR PULVERIZING ORES, WET OR DRY,

For Amalgamation or Concentration, and for Manufacture of Cement, Fertilizers, Paint and all other purposes for which grinding or pulverizing is required.

Send for Catalogue and Price List to

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145 BROADWAY, NEW YORK.

DEWEY & CO. { 220 MARKET ST., S. F. } PATENT AGENTS.
 Elevator, 12 Front.

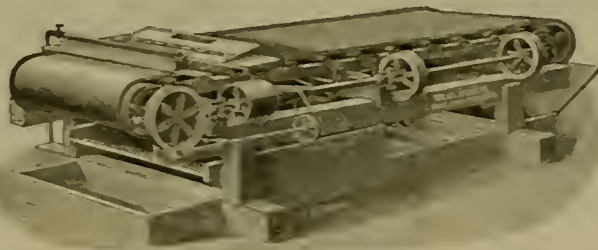
IMPROVED BELT FRUE ORE CONCENTRATOR.

The Best Ore Concentrator in the market, having double the Capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, crushing 350 tons per day, and is giving entire satisfaction as against 45 plain Belt Machines, taking the Pulp from the other 120 Stamps.

Price of Improved Belt Frue Vanner, \$825, f. o. b.
Price of Plain Belt Frue Vanner, \$575, f. o. b.

For Pamphlets, Testimonials and further information apply at office.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., Room 15, No. 132 Market Street, San Francisco, Cal.



Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 15, 1883; July 24, 1885. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), London, October 5, 1885.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly,
THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.
ADAMS & CARTER.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented Belt) - - - \$650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt - - - - - \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.



JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)
Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
GRASS VALLEY, NEVADA CO., CAL., NOV. 10, 1885.
Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.

GENTLEMEN:—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.
At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices.
(Signed) Sup't North Star and Original Empire Mining Co.
N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.



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SILVER-PLATED AMALGAMATED PLATES
For SAVING GOLD!
IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER
AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates Replated, Bought, or Gold Separated. THOUSANDS OF ORDERS FILLED.

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521 & 523 Market St., San Francisco

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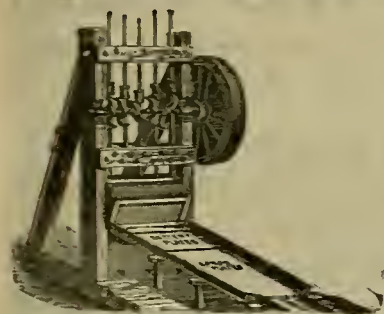
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—MANUFACTURER OF—

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HYDRO-CARBON ASSAY FURNACES



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IN QUARTZ, GRAVEL AND PLACER MINING.
PRICES GREATLY REDUCED.

Only Refined Silver and Best Copper used. Over 3000 Orders filled. Fifteen Medals Awarded. Old Mining Plates can be Replated. Old Plates Bought, or Gold Separated.

These Plates can also be purchased of JOHN TAYLOR & CO., Corner First and Mission Sts
San Francisco Gold, Silver and Nickel Plating Works, 653 & 655 Mission St., San Francisco, Cal., E. G. Denniston, Prop'r.
Our Plates have been used for 20 years. They have proved the best. We adhere strictly to contract in weight of Silver and Copper. SEND FOR CIRCULAR.

LEVIATHAN COTTON BELTING.

Superior to all Others for Quartz Mills, Smelters, &c.

Not Affected by Wet, Steam, Heat or Oils. Every Belt Guaranteed. Try It. Send for Circular and Samples.

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WINANS' ANTI-INCORUSTATION POWDER,

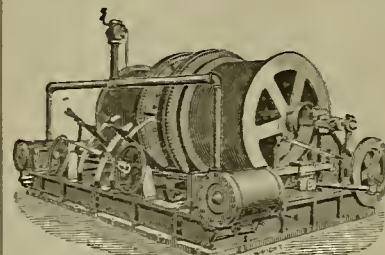
For Removing and Preventing Scale, Corrosion and Pitting in Steam Boilers.

Peerless Piston and Valve Rod Steam Packing.
Peerless Plumbago Sheet, Superior to "Cudrian."
Peerless Rainbow Sheet, will not harden under Steam.
Peerless Rainbow Manhole and Hand-hole Gaskets.
Manhattan Square Plumbago Piston Packing.
Gould's Combination Steam or Water Packing.
Macpherson Anti-Friction Metal, or any other article wanted in an Engine Room.



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HOISTING ENGINES FOR MINES



1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.

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PARKE & LACY CO., Agts., San Francisco.
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SQUARE FLAX PACKING.

MANUFACTURED FROM STRICTLY FIRST-CLASS FLAX AND PURE LUBRICANTS. HAS NO SUPERIOR for all Hydraulic Work.
CALICO WATER WORKS CO., CALICO, CAL., Dec. 16, 1890.
W. T. Y. SCHENCK—Dear Sir: We find your "Red-Cord" Square Flax Packing the "Boss." Yours truly,
J. R. LANE, Secretary.

The red cord runs the entire length. Put up in boxes of 20 feet, or coils of 60 to 80 lbs. For sale by all dealers. W. T. Y. SCHENCK, Sole Manufacturer, 222 and 224 Market Street, San Francisco, Cal.

PARKE & LACY COMPANY

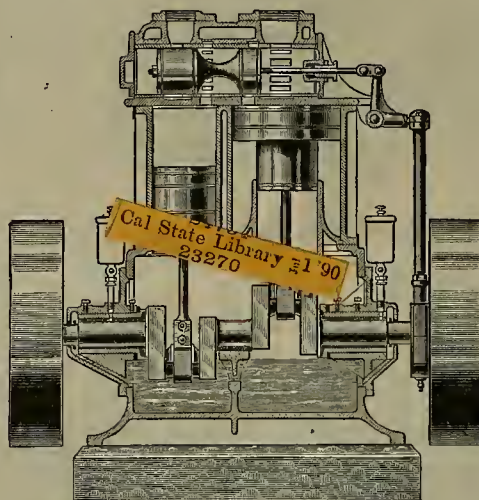
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TURBINE WATER WHEELS,
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GOLDEN GATE CONCENTRATORS,
GREATEST CAPACITY OF ANY CONCENTRATOR MADE,
One Machine Taking Pulp from 10 Stamps.



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GENERAL AGENTS FOR WESTINGHOUSE AUTOMATIC ENGINES.

COMPOUND, 44 ENGINES,
5215 HORSE POWER.

SALES DURING LAST FOUR MONTHS:
STANDARD, 99 ENGINES,
4500 HORSE POWER.

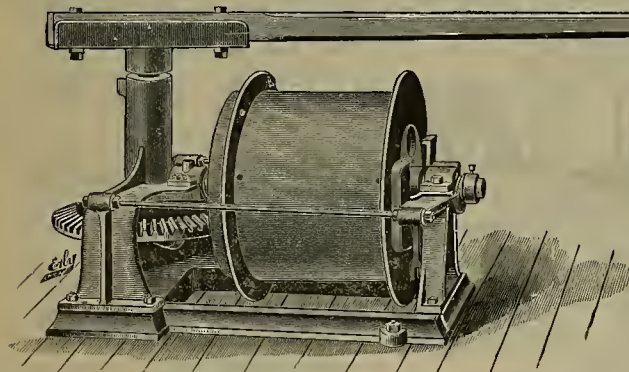
JUNIOR, 166 ENGINES,
4260 HORSE POWER.

Grand Total, 309 Engines, Aggregating 13,975 Horse Power.

21 and 23 Fremont St., San Francisco, Cal.

189 Clarence St., Sydney, N. S. W.

"Sensible" Horse Power Hoisting Whims.



These Hoisting Whims are built entirely of Iron and Steel, mounted on a heavy base plate, and, consequently, are very durable and cannot be affected by extremes of either cold or heat or climatic influences.

The hoisting drum is completely under the control of the person in charge of the hoisting or lowering through the shaft of the mine.

As the drum is entirely independent from the driving gears, the operations of hoisting, dumping bucket and lowering can be performed with the horse in constant motion, a feature not possessed by any other horse hoist in the market, and one that greatly increases their capacity by avoiding the loss of time due to stopping and starting the horse.

They are very light and compact, and can be packed for transportation by mules. Their cost of erection is very slight; two men, in half a day, being able to put one in place, ready for work.

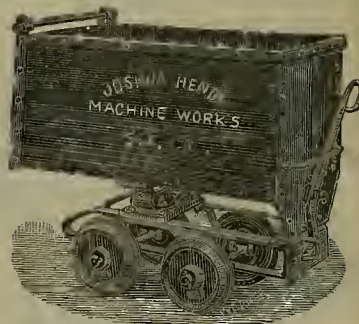
With each Whim, working drawings are furnished, showing in detail the proper construction of Gallows Frame and foundation for Hoisting Whim.

We carry in stock the following sizes:

No. 1.—Capacity with One Horse and Single Line, 800 pounds, 75 Feet per Minute.

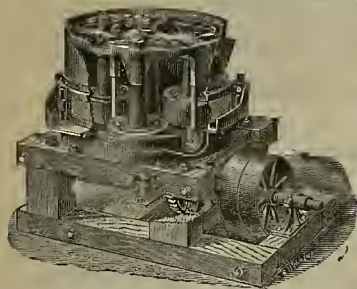
No. 2.—Capacity with One Horse and Single Line, 500 pounds, 125 Feet per Minute.

Weight of machine, 1200 pounds. Total shipping weight, including Sweep, Levers and Sheaves, 1400 pounds.



ROCK AND ORE CARS.

JOSHUA HENDY MACHINE WORKS,
NOS. 39 TO 51 FREMONT STREET, SAN FRANCISCO, CAL.



Centrifugal Roller Quartz Mill.

F. A. HUNTINGTON.

— MANUFACTURER OF —

CENTRIFUGAL ROLLER QUARTZ MILLS,
Concentrators and Ore Crushers,
Mining Machinery of Every Description. Steam Engines and Shingle Machines.

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PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEESE,

Sole Licensed Manufacturers of the

MEDART PATENT WROUGHT RIM PULLEY

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

SHAFTING, HANGERS AND APPURTENANCES.

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IT HAS NO EQUAL.

POSITIVELY FIRE-PROOF.

Can Be Put On
by Any One.



Adopted by the
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MAGNESIA SECTIONAL COVERING

For BOILERS, STEAM PIPES, COLD STORAGE, and all places requiring Non-Heat Conducting Material.

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ADAMANTINE SHOES & DIES FOR STAMP MILLS.

These SHOES and DIES are in extensive use in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited, subject to above conditions.

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CHROME STEEL WORKS, Brooklyn, N. Y.

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Special attention given to the purchase of Mine and Mill Supplies.



ALEX. HEINS

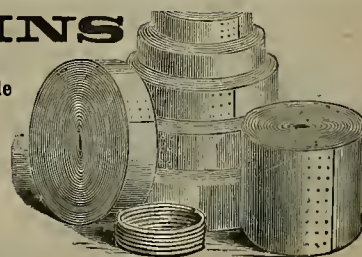
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Manufacturer of Leather and Felled Rawhide

BELTING,

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MINING AND SCIENTIFIC PRESS.

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An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXI.—Number 7
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, FEBRUARY 14, 1891.

Three Dollars per Annum
SINGLE COPIES, 10 CENTS.

A Smelting Plant.

We illustrate herewith a complete smelting plant of 100 tons' daily capacity, embodying all the details of first-class smelting works, as employed for large mines or custom work. Two large water-jacket furnaces with telescope stacks, are employed; the dust and fumes pass into a stone or brick condensing flue through connections under the charging floor. One large Baker blower is used (driven from the engine-shaft direct) which supplies the blast for both furnaces.

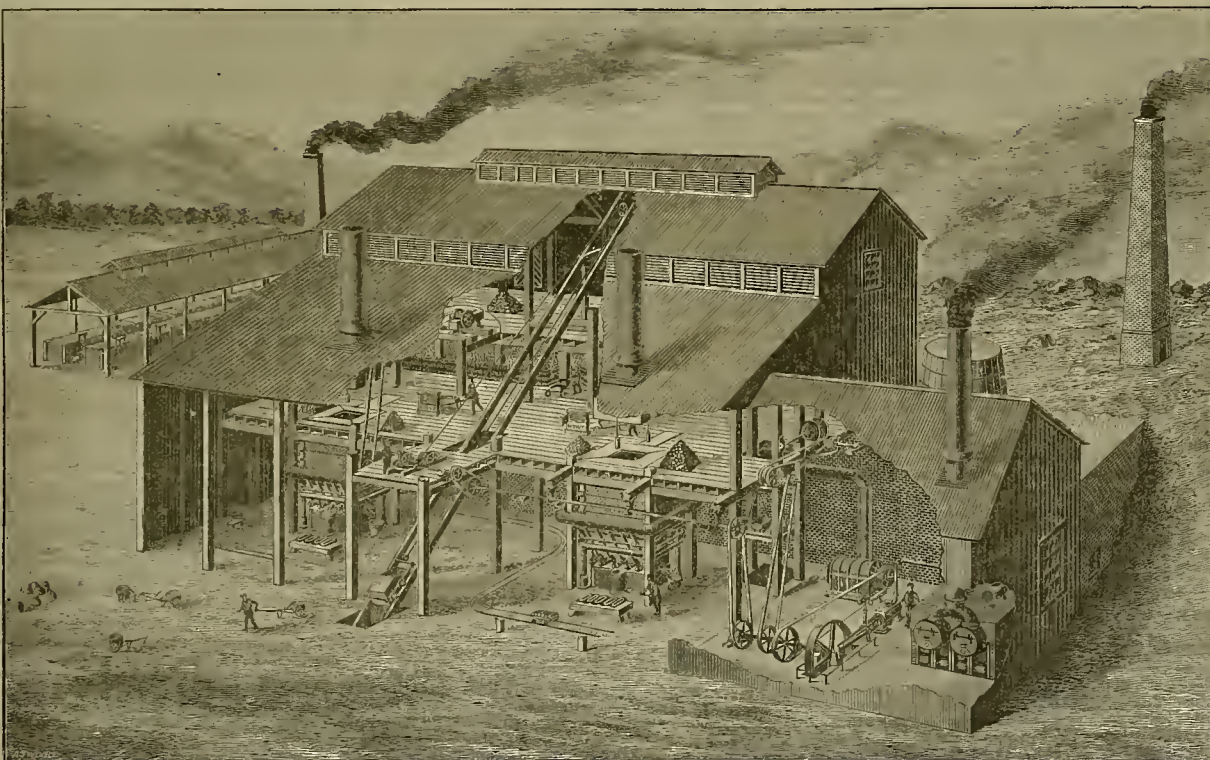
A large Blake crusher, situated above the charging floor, crushes the ore and fluxes as well as the matte and slag which is found necessary to be again passed through the furnaces. The slag and matte are raised to the crusher floor by means of a self-dumping skit (traveling on the incline shown in the center of the cut) extending to the top of the crusher floor, and is operated by a small friction hoist, treated on the charging floor end to the left of the incline ways. An elevator is also provided for the purpose of gaining access to the charging floor, or transferring barrels, tools, product, etc., from one floor to another. This is shown in the cut to the right of the first furnace, near the engine. On the main or charging floor will be seen the scales used in weighing the ore, fluxes and fuel before being charged into the furnaces.

The entire plant is driven by one large automatic cut-off engine, the steam for which is supplied by two boilers. These boilers are set independently, each being of sufficient capacity to run the engine; it is considered best to have one in reserve, as in case of accident to steam connections, cleaning or repairs, no time is lost by stoppage of furnaces.

A water-supply tank is situated in the rear of the engine-room, as shown, from which the water is supplied to the jackets. In a separate



PAVANT BUTTE, LAKE BONNEVILLE REGION, FROM THE SOUTH.—See page 105.



COMPLETE WORKING PLANT WITH PACIFIC WATER JACKET SMELTERS.

building at the side of the works will be observed the long roasting furnaces in which rebellious ores, or such as contain large quantities of sulphur, zinc, antimony, etc., undergo a preliminary roasting before going to the smelters. The method of arrangement here shown is not arbitrary, as the ground selected for the site often requires changes. This arrangement of plant is one designed by the Pacific Iron Works of this city, but they can arrange differently to meet the requirements of any site.

The Pacific water-jacket smelter for lead ores, made by the same firm and used in this smelting plant, is illustrated on page 105. It is a pattern in general use in the large custom smelting works in the United States. It embraces all the valuable features that 20 years' experience in smelting can suggest, and is entitled to be considered one of the most improved types of smelters made.

The jackets are made of the best fire-box flange iron, in four sections, and are constructed in such a manner that no rivets are exposed to the fire. The tuyeres are made a part of the jacket and surrounded by water in active circulation. Hand-holes are provided for removing any sediment that may collect, and are furnished with plates and crabs.

(Continued on page 105.)

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

American Enterprises and English Capital.

EDITORS PRESS:—An editorial in the London *Financial News* of December 23d last, on a certain packing concern, is likely to be read with considerable interest among promoting men. I do not wish to say anything for or against the enterprise in question, as I know little of its affairs, but rather the inference drawn that investors should beware of American industries. Now the plain truth of the matter is, English investors are all right and American industries are all right. The trouble is the two do not always come together, and for this, I think, parties on the other side are to blame rather than people here. English promoters are too difficult to deal with; they hedge themselves about with a perfect jungle of impossible conditions; they must have bonds and options; they must have oceans of time; they must be privileged to take up a thing and drop it 20 times more if it suits them, and the American owner must preserve his temper unruffled all the while and he always ready to both up with the serene and most complacent of smiles. What is the result? The owners of first-class American properties refuse to deal on such a basis, and promoters and others are relegated to inferior enterprises that are generally itching to be sold out to somebody; and this is the reason I may say so much valueless stuff from all over the world is dumped into England. When the owner of a great industry here is approached on behalf of Englishmen, he generally laughs at the idea of selling; gradually he may yield to the insinuating allurements of the agent. He takes the letter through his establishment and shows him all that is to be seen; is very free and lavish, in fact, on all points necessary to convey a comprehensive idea of the business. The agent is able to write home the extent of the works, the number of hands employed, the price, the approximate profits—enough, in one word, to enable any one with sense enough to seek shelter in a rainstorm, whether such a property would be desirable or not. Generally he receives no such answer, but is contently informed the matter cannot be entertained in any such shape, and they (the principals) will pay no attention to anything that is not first firmly secured by bond, option or contract of some kind. The agent returns to the owner and explains matters; but the latter has his own way of doing business, and demands that a certain sum be put up as a guarantee of good faith before he opens a book or makes a statement. He argues very truly the London promoter runs no risk, as in case the showing is not found satisfactory or up to requirements previously stipulated, the deposit money is to be returned to him. Beyond this, the owner, independent and probably far richer than his London correspondent, cannot be budged, and the consequence is the negotiations end in smoke; and the agent, after several such experiences, is finally forced to take up some shaky institution which is only too willing to dance attendance on the whims and vagaries of London promoters for the pleasure of being foisted at last on the market. This I am convinced is the root of the evil complained of, and unless promoters are willing to put up something to get hold of a property that is notoriously good, or one on which they have been reasonably informed, they will continue to be imposed on by things that inevitably wind up by bringing disaster on the public and discredit on themselves.

VESPUCIUS.

San Francisco, Feb. 7, 1891.

Digging Out Gophers.

EDITORS PRESS:—To many who are not fully familiar with the habits of the gopher tribe, I would offer the suggestion that no better time than the present is fitted for exterminating them.

There are many ways for disposing of them; with myself after considerable experimenting the cheapest and quickest way to my notion is to dig them out of the soil.

This may seem to many people to be a hard and tedious way of eradicating the gopher, but if once tried it will be found a quick, pleasant and positive way for getting rid of them.

The gopher does not bury deep in the soil as many people suppose, but follows along from 4 to 15 inches below the surface, seldom exceeding 12 inches, unless in near proximity to their domicile.

The gopher builds for itself a home in such a way that if once in the seclusion of its nest it is safe from all water influences, building as it does near to the surface of the ground, and covering its nest carefully with sticks laid in such a way that a thorough drainage is assured.

Always does the gopher dig down into the earth to the depth of 15 or more inches for a full drainage of all water that would fall naturally—the earth below absorbing the water.

My plan in digging the gopher out is to follow the hole till two holes are found running in opposite directions. At this point leave the first and look for a second gopher home; do the same with this one, and

so continue till the rodent of the first hole has dumped more earth. This will show in which direction it is working, and by carefully following on this plan extinction is assured.

In and near the month of March is the gophers' breeding-time, and from one to a dozen of these pests may be found in a single hole.

S. H. RENO.

Fruit Vale, Alameda Co., Feb. 2, '91.

Notes from Sonora.

EDITORS PRESS:—The company of which I wrote in my last communication as working at the Sierrita, near this place, has recently purchased in the Altir district a five-stamp mill, which they have taken down and are now removing to its new location near the mines. It is to be erected on the old millsite occupied by Magruder & Fisher's mill several years ago. I understand that from these mines, during the past 14 months, nearly \$100,000 worth of ore has been shipped and a large dump of good average-grade milling ore is ready for the mill.

Mr. Henry Martin of London, England, a gentleman largely interested in mining properties in this State, has been here since early in December last looking after his interests, and it is reported that he is about to bring out some new companies in London on his return.

There is talk of a smelter to be erected near here by San Francisco people, and it is hoped that the project will be carried out. There is room here without doubt, and a very profitable business can be built up very quickly. The McKinley bill has prohibited the sale in the United States of the lead ores of this country, and in other States the erection of reduction works for custom ores is well advanced, notably so along the Mexican Central R. R., where others are proposed.

About 20 miles east of Querobabi Station, on Sonora R. R., is a mine and mill situated at a high altitude. The mine is old and has been much worked by Mexicans. The ore is silver and much of it rich and adapted for shipping. The mill is five-stamps and was largely brought from Sierroque, on the Sonora river, by its owners, Riordou, Frederick and Shea, who formerly worked the San Augustine mine near that place. The San Augustine mines were originally called Las Guijas, and, singularly enough, its owners, after working it out, moved to another Las Guijas, the old name of the present property. The working average of their ore is said to be in the neighborhood of \$100 per ton. It has to be roasted before amalgamation, after which process a very small percentage is left in the tailings.

The St. Helena mill, at Delicias, has not yet started, I am told, but will very soon.

The Oro Negro Company, near Arizona, is said to be very successful. It is under the control of Messrs. Gage, Darke & Kirk of Tombstone fame. Their consumption of salt in roasting is heavy and furnishes transportation work to a vast number of burro owners and freight wagons.

The Nicosari country in which this property is situated is a good country for prospectors. Formerly the Apache was the almost sole occupant. A mine of very great fame and antiquity is some 30 miles east of Oro Negro; its name is Churrunhabí, and is now being worked by Mr. P. W. Smith and several others. Mr. Smith is a man well known in Tombstone, and in fact all over Arizona, Mexico and the frontier as one of the pioneers.

Freight business is increasing rapidly on the Sonora railroad. Oranges and ore are going out and machinery and goods are coming back to the country. From this date to May the climate is fine, and those who desire to look at mines can find no better time in the year to visit Sonora. Already there are many experts and capitalists coming, and if free coinage of silver takes place, there is bound to be a boom in mining here.

"AMERICANO."

Hermosillo, Mexico, Jan. 27, 1891.

A RICH SILVER STRIKE.—Last week we referred to a rumor that a rich strike had been made by A. P. Sayre, in one of his mines in the Patterson District, about eight miles north of Bridgeport. We are glad at being able to say that this week the report has been confirmed, Mr. Sayre having made a rich strike in his Homestake tunnel, which he has been running from Silverado canyon. All who have visited the Homestake agree as to its being a rich strike, there being at last accounts from the mine at least three feet of rich silver ore in sight. W. A. Irwin, late superintendent of the Bodie Con., laid over at Sweetwater, on his way to San Francisco, and examined the new strike, which he considers a valuable one, and he is still there watching the prospect. This is an encouraging strike, as it shows a permanent ledge, Sayre having previously taken out good ore in the upper workings, and will strengthen the faith our people have in the "coming out" of the Patterson District.

—Bridgeport Chronicle Union.

THE MINER'S HOSPITAL.—Hunewell has introduced a bill asking for an appropriation of \$100,000 to purchase a site and erect buildings for a State Asylum and hospital for indigent and aged miners. This is a bedrock proposition, for, next to the soldier veteran who stood in front of the guns, the nation is indebted to the old miners who produced the bullion that paid the expenses of the war.—*Sacramento News*.

Shasta County Coal.

The latest addition to the museum of the State Mining Bureau has been contributed by Oscar Schulze in the shape of a specimen of fine lignite coal from Section 12, Township 33, Range 2 west, 25 miles northeast of Redding. The analysis of the coal shows up well, and as the vein is said to be easily accessible by a short line from Redding, the California coal problem seems nearer solution than at any previous period. The analysis gives the following figures:

Water	9.50
Volatile carbonaceous matter	37.50
Fixed carbon	46.25
Ash	6.75
	100.00

The great trouble with all the California coal deposits is that the seams or veins are thin and of limited area, except in the Mount Diablo field, which has been nearly worked out. In many of the coal basins so far located the veins do not exceed one or two feet in thickness, and when they do there is such an admixture of slate as to render the product almost worthless on the market. Another difficulty has been that most of the coal deposits lie at a considerable distance from existing lines of railroad.

In 1874 a coal-bed 12 feet in thickness was exposed in Shasta county, not more than a mile and a half from the location of the present find. The deposit did not consist, however, of solid coal, but of alternate layers of coal and slate, the thickest coal seam being only 22 inches. Previous to the present discovery numerous coal croppings had been exposed in this part of Shasta county, but none of them justified working on commercial principles.

In Shasta county generally the coal deposits lie in the foothills, where the volcanic materials which cap the mountain spurs and ridges are generally underlain by a body of coal-bearing strata of recent origin. These strata consist of soft and unaltered shales and sandstones, and they are spread out unconformably over the upturned edges of the metamorphic gold-bearing slates which form so large a portion of the mass of the Sierra. Their general position is not far from horizontal, and the aggregate thickness of the coal-bearing strata is not more than 150 feet. They belong to the geological period which immediately preceded the commencement of volcanic activity in the Shasta region.

The new mine is said to prospect well, and the specimen of coal sent to the Mining Bureau is of superior quality. The seam is 20 feet in width.

Prospecting the Comstock.

The *Virginia Enterprise* says: The field of prospecting work upon the Comstock lode is yearly getting down to narrower limits, and the question now agitating the mining world is the redemption of mineral ground below the water-line. There is no limit to the country in that direction. The other way, it is bounded by the grass roots.

As matters stand, the Yellow Jacket series is engaged in prospecting an interesting block of mineral country between the 600 and 900 levels, with every prospect of opening out enough ore to run the Brunswick mill of 76 stamps for a few seasons. The outlook in Overman is very promising for the continuance of the extraction of pay ore. The Belcher and Crown Point are opening out ore to run on in their lower levels. Potosi is liable to show up milling ore at any day. Chollar is running steadily upon milling ore. Savage has ore, and in conjunction with Hale and Norcross is opening out more ore on a lower level than formerly operated. These two mines have a block of ground 500 feet in depth to the water-line that has been but little prospected. Gould and Curry has every prospect to produce ore this season. Con. California and Virginia has a big block of ground between the 1200 and 1500 levels that has not been prospected, and the company is also opening another block between the 1650 and the water level, which is about the 1900. The starting up of the Union means the thorough prospecting of a vast section of mineral country between the Union shaft on the east and the west wall of the Comstock, and between the Hendricks, Scorpion and East Sierra Nevada ground on the north, including the Sierra Nevada ground proper, to the Ophir ground on the south, and from the surface to the water level. The finding of an extensive body of ore in the section of country bounded as above described would inaugurate a boom on the Comstock of magnificent proportions. The country described lies within the walls of the Comstock ledge, and that's the place to look for ore.

DETECTION OF ORGANIC MATTER IN THE ATMOSPHERE.—Mr. A. H. Smee closes a glass funnel by drawing out its neck to a fine point, places it in a stand, and fills it with ice. He allows the aqueous vapor that condenses from the atmosphere on the outside to drop into a vessel, and measures the quantity thus accumulated in a given time and determines the ammonia by one of the usual methods. By this means, called "distillation by cold," substances that are decomposed by high temperature can be condensed. The perfume of flowers, for example, can be distilled by placing them under a bell-jar with the funnel.

Hydraulic Mining.

The condition of affairs in the old hydraulic mining towns is becoming deplorable. Business is almost paralyzed, there is very little money in circulation, and scores of families who were once possessed of good properties find it difficult to provide themselves with the necessities of existence. In most of the hydraulic districts the quality of the rugged ground and the high altitude preclude the possibility of doing much in the way of agriculture, and the people are left without any means of livelihood whatever. The gold is so widely scattered through the ground that drift mining is out of the question, and the future presents a very blank prospect unless some method is devised by which hydraulic mining may be resumed. The miners are living on patient and hopeful. They are becoming poorer every year and every moment, but there are thousands of them firm in the conviction that they have rights which must be recognized soon, and they abide in the belief that they will get justice. The hope that just now buoy them up is that the report of the Government Commission, which it is expected will be made public this month, may contain something in favor of the miners and possibly some suggestions for the relief of the hydraulic mining interest. If that report falls him, the miner has no resource to fall back upon except the almost hopeless minority interest of a handful of State legislators and one or two Congressmen in his behalf.

In his first message, Governor Markham has not forgotten his pledges to the miners, and he declares without hesitation that Congress should be invoked to assist in the solution of the problem, because the continued production of gold is a subject of national importance. That is true. It is not the miner alone who is interested in the resumption of hydraulic mining. It is his immediate concern, but of more moment still is the direct interest of sixty-six million people in maintaining an undiminished supply of the great medium of exchange for the public use.

The issue of the controversy over hydraulic mining is but a small portion of the area of the country. About one-half of that portion has had its rights upheld at the expense not only of the other half, but of the whole United States. It has been permitted to become a local question because the whole sixty-six million of our people did not realize that they were interested in the outcome. This was very clearly a mistake, and it is now the duty of our Congressmen, particularly those from the mining districts, to put this subject before Congress so forcibly and with such untiring industry that "the combined wisdom of sixty-six million of people," as embodied in the Government at Washington, shall afford relief not only to the long-suffering miners of California, but to every one in the country.—*Placer Republican*.

The Astronomical Society.

The largest and most active scientific society on the Pacific Coast is the Astronomical Society of the Pacific, the 55 members added at the last meeting bringing the membership up to 400. It is recognized as a "live" society, and applications for membership come from all parts of the world. It is probable, moreover, that the society will rapidly increase from this time on, as the by-laws have been amended by the addition of a new section authorizing groups of members of the society, outside of San Francisco, to form sections, each of which shall elect its own officers and adopt its own rules of government. None but members of the society shall be eligible to membership in sections. Under the provisions of this amendment, the members of a section formed at Chicago were elected members of the society, and the Chicago section was then recognized.

The directors adopted a seal, and resolved that, beginning with this year, all moneys received for life memberships shall be invested in a separate fund, only the interest from which shall be used in defraying the expenses of the society.

Messrs. Schaeferle and Burckhalter were appointed a Committee on Medals for 1891. As the next meeting will be the annual meeting, committees were appointed to audit the treasurer's accounts and to nominate officers and an executive committee. After the directors' meeting the society meeting was held, at which the following papers were read: "The Carleton College Observatory," by the director, Prof. W. W. Payne; "The August Meteors," by W. H. S. Monck, Dohlin, Ireland; "Corrections to Watson's Theoretical Astronomy," by W. W. Campbell, Ann Arbor, Mich.; "Notes on Dark Transits of Jupiter's Satellites," by John Tehhntt, Windsor, N. S. W.; "Motions of the Nebulae in the Line of Sight," by James E. Keeler, Lick Observatory.

THERE is considerable uneasiness among mining men on account of the proposition before the Legislature to tax patented mining claims in Nevada.

THE nitrate output of Chili is to be regulated, and the companies will shut down for five months of each year.

MURPHY & SEMLE struck a pocket near Centerville, recently, from which they took \$11,000 in fine gold.

Amalgamation at the Comstock Lode.

A Historical Sketch of Milling Operations at Washoe and an Account of the Treatment of Tailings.

NUMBER I.

[By A. D. Hodges, Jr. Read before the American Institute of Mining Engineers.]

I. Early Workings of Placers.

In May, 1850, the first gold from the Comstock lode was discovered in the sands near the Carson river. It had been washed down by natural agencies, through Gold Canyon, from the decomposed rock of the ledge above. Within a few weeks the precious metal was traced more than three miles in shallow deposits along the bed of the canyon from the river to the Devil's Gate—a narrow, rocky cleft, notable to the teamsters of a later day chiefly as the place where "Uncle Jimmy Fair" collected high tolls, and could not reduce the rates because "this was all he had for the education of his poor children."

From 1850 to 1857 a floating band of miners, whose number varied from 20 to 200, washed the Gold Canyon placers with rockers and long-toms, making from \$4 to \$5 a day each until the last-named year, when the deposits were in great measure exhausted. The chief settlement of these miners was at Johnstown. During only a third of the year was the water supply sufficient for their work. The remainder of the time they utilized in desultory prospecting of the hills, and in occasional forays for supplies among the Mormons in Carson valley.

In 1857 the Groesch brothers discovered the Comstock lode at some point, now unknown, in Gold Hill, but their discovery perished with them. Early in 1858, the "Pioneer Quartz Company," having located several of the small surface veins around Silver City (whose connection with the main lode has never been definitely shown), built an arrastra and worked some of their ore, but the returns were so small that they soon abandoned this business. The following winter, James Finney and his partners found gold in place in crumbling surface rock at Gold Hill, located claims there and worked the auriferous material in rockers with good results. Other claims were speedily taken up, and in the spring of 1859 half a dozen arrastras were in profitable operation. In the following summer arrastras were in use also at the new discoveries in Virginia City, the number at Gold Hill was largely increased, and a few were started down on the Carson river.

II. The Discovery of the Washoe Process.

Up to this time the miners had sought for gold only, with no thoughts of any other metal than that which the California mines were yielding. But the assays made in June, 1859, by Melville Attwood, showed that the Comstock lode was a rich auriferous silver deposit, and the treatment of silver sulphurets became an important question. Samples of the ore were sent to be tested in the various metallurgical works of California, and some of these samples came into possession of Almarin B. Paul, an able and energetic millman of Nevada City. Paul was fully posted on all the details of gold-milling, as practiced in California, and had read various works on the metallurgy of silver. It occurred to him to treat the sulphurets with the chemicals of the patio process in the pans then used to some extent in the gold-mills, and the results of his tests, made in the autumn of 1859, convinced him that this treatment could be applied with success to the Comstock ore. With characteristic energy he organized the Washoe Gold and Silver Mining Company, No. 1, and on May 25, 1860, began work on a mill-site near the Devil's Gate, in Gold Canyon. On June 7th he ordered his machinery at the Miners' Foundry, San Francisco, his enthusiasm and confidence being undisturbed by the general distrust and even ridicule with which his plans had been received. On June 12th, he signed contracts to work several thousand tons of ore from the Gold Hill claims (at \$30 per ton), the contracts being made conditional on the completion of his mill within 60 days from date—a condition which only a bold man would accept in those times, when material for construction was so far away and transportation was so difficult and uncertain. On August 11th, just within the limits of his contracts, the 24 stamps of his Pioneer mill commenced to drop. Three hours later, Charles S. Coover and Dr. E. B. Harris, who had been inspired to rivalry by Paul's example, set in motion the machinery of the little eight-stamp mill which they had built near by in Gold Hill.

Paul crushed the ore dry in his batteries, and amalgamated it in Knox pans, which were 4 feet in diameter by 14 inches deep, and held charges of about 300 pounds each. The light iron muller, revolving 12 or 13 times per minute, did not grind, but served merely to stir the pulp for the purpose of effecting a distribution of the quicksilver throughout the mass. Copper plates were fastened in the pans in order to hasten the reduction of the silver. A part of the amalgam adhered to these plates and was scraped off twice a day. The rest was drawn off at intervals through a discharge-hole.

Each charge was treated with 40 pounds of quicksilver, a pint of salt and a few ounces of copper filings or copper sulphate. The pans were set on brick furnaces and heated by wood-fire, and the water used was warmed by the

located wherever there was any available water exhaust from the engines. At a later date, in place of the brick furnaces, iron stoves were used, with circular flues, through which the heat and smoke were led beneath the pans. Then Paul suggested steam-chambers fitted to the pan-bottoms, a suggestion adopted and perfected by Howland.

Thus Paul invented the Washoe Process. With due acknowledgment of what others had done, to him should be given the credit of being the first to work out, and apply successfully on a large scale, the method of treating silver-ores by pan-amalgamation.

III. The Building of Mills.

Paul's first mill-runs, and also those of Coover and Harris, gave satisfactory results, and increased materially the mining rush and excitement which had now set in. Claims were taken up all over the country in the neighborhood of the lode, and mill-sites were quite a number of mills were built in 1860. Paul's company (the Washoe Gold and Silver Mining Company, No. 1) at once putting up a large establishment at Gold Hill. In 1861 there were already 76 mills erected for the purpose of treating Comstock ore, with 1153 stamps and an estimated daily crushing-capacity of 1200 tons; and 20 more were planned or in process of construction. There were also 40 or 50 arrastras and several patio-yards. The mills lived Seven-Mile, Six-Mile and Gold Canyons, from Virginia City to the Carson river, and the Carson river, from above Empire to below Dayton; and several were placed more than a dozen miles away, at Ophir and Franktown, on the borders of Washoe Lake. The mill-building mania kept pace with the mining excitement which culminated in 1863, and was followed by a stock-panic in 1864, although the bullion-production of the lode continued to increase. In this time some 700 mining companies had been incorporated to operate on the Comstock; but of these only a hundred possessed prospected mines, and only 14 had paid dividends. The number of mills built approximated about 150, the exact figures being unobtainable, on account of the indefiniteness and variance of the published statistics. Their capacity was always in advance of the ore supply. Many were erected for mines which never produced anything except litigation and assessments. A large number were hastily and poorly built, and, as rapid improvements in machinery and construction were made, soon became antiquated; but some, notably the Ophir and the Gould and Curry, were erected in a most gorgeously expensive manner. The majority were pecuniary failures from the start; but, in the more fortunate cases, where there was a constant supply of rich ore, with charges varying from \$20 to \$30 per ton, large profits were obtained.

The first published list of Washoe Mills, with full details, so far as I know was that given in the MINING AND SCIENTIFIC PRESS of Sept. 29, 1866, and this is avowedly incomplete, it being stated that there were "a few small mills, running irregularly, not enumerated." The total number given is considerably less than that contained in the "Surveyor-General's Report," for 1865, where eighty mills are mentioned. The Report of J. Ross Browne, United States Commissioner of Mining Statistics, under date of March 5, 1868, states (pp. 324-328) that there were in Storey, Lyon, Ormsby and Washoe counties, in 1867, 122 mills with 1921 stamps. The same report (pp. 352-360) gives a detailed list of the mills in the same counties which were crushing ore from the Comstock lode in 1866. Here, the numbers are 77 mills and 1462 stamps. According to this last list, there were seven mills with 40 to 80 stamps each, two mills with 30 stamps each, 20 mills with 20 to 25 stamps each, 39 mills with 9 to 18 stamps each, six mills with eight stamps each, three mills with five stamps each.

The seven largest mills mentioned were the following:

1. The Imperial mill, 44 stamps, at Lower Gold Hill, built in 1860. I have always understood that this was the second mill erected by Almarin B. Paul, who, in different publications, is said to have put in 48 and 64 stamps. The mill came into the possession of the Imperial Mining Company and ran for many years.

2. The Gould and Curry mill, 80 stamps, at the junction of Six-Mile and Seven Mile Canyons, on the site occupied later by the Omega Tailings mill, was built in 1861 by the Gould and Curry Mining Company. Its costly construction and brief career have been described frequently.

3. The Ophir reduction-works, 72 stamps, with furnaces, barrels, patio-yards, etc., erected in 1861 at Ophir City, in Washoe valley, by the Ophir Mining Company, rivaled the Gould and Curry mill in expense of building and shortness of existence.

4. The Rock Point mill was built in 1861 on the Carson river, near Dayton. It had 40 stamps, which were increased to 56 in 1864. It belonged to the Imperial Mining Company and had a successful career until the building of the Virginia & Truckee railroad diverted its supplies to more accessible establishments.

5. The Mexican mill, 44 stamps, on the Carson river, at Empire City, was built in 1862 and was quite noted in early days. It was owned originally by private parties and employed educated metallurgists. Here experiments were made and processes tried which aided essentially in the development of silver-amalgamation at the Comstock. In 1868 the mill was bought by the Yellow Jacket Mining Company. Subsequently it passed into the

hands of the "bonanza firm." It was running at last accounts.

6. The Washoe reduction-works, better known as Dall's mill, 60 stamps, were built in 1863 at Franktown, in Washoe valley, by Captain J. H. Dall, after the general model of the Ophir reduction-works, and ran as a custom-mill. They were destroyed by fire in December, 1866, but rebuilt the next year and maintained a precarious existence until June, 1871, when they were again burned down.

7. The Morgan mill, afterward known as the Yellow Jacket, on the Carson river, at Empire City, was built as a custom mill, with 20 stamps, by James Morgan in 1864. It was sold to the Yellow Jacket Mining Company in 1865, and enlarged to 40 stamps, 20 of which weighed 1050 pounds each. In 1871, it passed into the hands of the Nevada Mill Company and worked ores for this company until 1875, when it was purchased by the Pacific Mill Company, which still owns and operates it.

IV. Milling Combinations.

A new era in the mill business may be dated from the advent, in 1864, of William Sharon as agent, in Virginia City, of the Bank of California. Sharon was a shrewd financier and keen speculator, was backed by William Ralston, manager of the parent bank in San Francisco, and had an enthusiastic faith in the Comstock lode. When he arrived, although stocks were low and mining depressed, he unhesitatingly loaned money to mining companies and mill-owners at much lower rates than had previously prevailed. The rate of interest had been from 3 to 5 per cent per month. Sharon asked 2 per cent and soon had put out large sums at this figure.

Worked-out mines and idle mills being worse than valueless as securities, and no new bonanzas coming to light, while assessments continued frequent, the bank seemed for long to be on the point of sustaining heavy losses, and many of its stockholders became frightened. But Sharon possessed the confidence of those holding the largest interests in the bank, and with their aid continued to carry out the plans he had formed. He and his friends, known popularly as the "Bank Ring," secured control of the principal mines, buying the shares at low figures, and by able stock manipulation not only guarded against loss but made very large profits. The next step was to acquire mills and form a milling company under the corporate name of the Union Mining and Milling Company. The mills were obtained, first by foreclosing mortgages and then by a sort of "freezing-out" process. The number of these establishments in Washoe had been steadily decreasing since 1863, but the capacity of those standing had been enlarged, so that competition was sharp and milling-charges were falling. In 1865, when the effects of Sharon's plans commenced to be felt (and these plans included a business-like working of the mines), the price of crushing fell from \$25 and \$22 per ton to \$17 and \$18. This year, according to the statements of Samuel Bowles, in the Springfield Republican, there were 77 quartz-mills, with 1019 stamps, working Comstock ore, capable of crushing daily about 1850 tons, but running at only two-thirds capacity. Of these mills, 22 were connected with mines and 55 were doing custom-work. The troubles of the custom-mills were soon greatly increased by the refusal of the mines controlled by Sharon and his associates to give them ore at any price; and thus many mill-owners were obliged to sell their properties to the Union Mill Company (or to join it) on such terms as this company would allow. The Union Mining and Milling Company was formally incorporated in 1867, after seven mills had been taken by foreclosure by the bank. These seven mills were at once transferred to the new company, whereupon the price of milling asked by outsiders fell to \$15, and then to \$10 per ton. Within a couple of years more, the company had acquired "nearly 30 mills" (MINING AND SCIENTIFIC PRESS, Aug. 24, 1869), and for a time had almost a monopoly of the milling business at the Comstock. Possessing ample capital and doing a profitable business, it made many improvements in the construction of mills, and in 1871, built the largest and best establishment of the kind in Washoe—the Eureka mill, on the Carson river, with 60 stamps of 940 pounds each, and 24 improved pans. The motive-power was furnished by a 52-inch Leffel-turbine placed with its shaft horizontal—the first time, it was said, this had ever been done.

Sharon aimed at complete sovereignty over the Comstock, but the kingdom was too large and the fortunes of the various mines were too fluctuating for him to be able to hold everything against his rivals. Not being a miner, he had to depend on others for information concerning the interior conditions of the mines, and could not always be sure of the correctness of the information thus derived. He openly accused Jones of deceiving him in 1871, concerning the Crown Point mine, and a bitter controversy ensued. He also had a public discussion with John Mackey as to whether this gentleman had not induced one of Sharon's experts to give deceptive reports, and is said to have declared that he would "have John packing his dinner-pail yet"—a prophecy unfulfilled at last accounts.

The first formidable competitor to come into

*The old Gould and Curry mill had 80 stamps, the Ophir reduction works had 72, and Dall's mill had 60; but none of these were so well equipped or had the capacity of the Eureka, and the first two had been destroyed at this date.

general notice was the Nevada Mill Company, formed by Alvinz Hayward of San Francisco and John P. Jones of Gold Hill, who, in 1871, wrested from Sharon the control of the Crown Point mine and diverted large supplies of rich ores to the mills which they acquired. This mill company controlled by purchase and lease as many as 15 mills at one period. Among these, the most noted were the Morgan, the Mexican and the Brunswick. The original Brunswick mill, built in 1863, was an eight-stamp establishment. Passing into Sharon's hands, it was rebuilt and improved. As remodelled in 1871 by the Nevada Mill Company, it had 56 stamps of 550 pounds, 26 Horn pans with settlers, etc., and vied with the Eureka mill in excellence of construction. Its last runs were for account of the bonanza firm.

Jones and Hayward did not secure many Comstock mines. When the Crown Point bonanza was exhausted, their controlling influence was diverted to other districts, and their most important mills were taken over by the next company to be named.

In 1869, James G. Fair and John W. Mackey of Virginia City had secured control of the Hale and Norcross mine, then in bonanza, and associated themselves with James C. Flood and William O'Brien of San Francisco. These associates formed the Pacific Mill Company and purchased several mills. They next gained possession of the Savage and the Bullion mines; but they obtained no ore from the latter, and only low-grade material from the former; and before long the Hale and Norcross ore body was exhausted. While in search of new properties, in 1871, they acquired the Virginia Consolidated (afterward divided into the California and the Consolidated Virginia mines) where the Big Bonanza was developed in 1873. The history of the bonanza firm is well known. The Pacific Mill Company built the famous Consolidated Virginia and California mills, the most noted quartz-mills in the world, and acquired a supremacy surpassing that of the Union Mining & Milling Company.

V. Various Amalgamation Processes Tried.

Paul's results in 1860 were accepted by the great majority of miners as fully proving the efficiency of his process. But the largest companies, the Ophir and the Gould and Curry, with exaggerated ideas of the richness of their ores, and under the influence of conservative ideas, preferred to adopt methods which had the advantage of greater age.

In 1860, the Maldonado Brothers, who were Mexicans, put up extensive yards in Virginia City to work the ore of the Mexican mine by the patio process. Their example was followed by a few others, among them the Ophir Company, which tried this method at its large establishment at Washoe valley. The patio process is slow, imperfect and expensive. Brought into competition at the Comstock with other methods, it proved a failure and was soon abandoned.

The "Freiberg process," as it was commonly called—chloridizing, roasting and amalgamation in barrels—was adopted at the Ophir works and at Capt. Dall's mill, both in Washoe valley, at the Mexican mill in Empire, and at the Central mill in Virginia City. Kestel & Co., and Sutro & Co., in their Dayton mills, roasted their ores and then amalgamated in pans. Roasting was very expensive at the Comstock. Partly on account of the cost, and partly from the desire to get bullion returns as speedily as possible, the Freiberg process was given up. Dall alone retained it to the end; but his mill received only the richest grades of ore, which could afford to pay high transportation rates and a milling charge of \$45 per ton; and these ores became very rare.

The Gould and Curry mill adopted the Vetch process, which was about the same as the patio, except that steam tubs were substituted for barrels. The Central mill used this process in the beginning. In neither mill was the method a financial success. The Gould and Curry mill changed to pan-amalgamation, and the Central made trial of the Freiberg process.

About 1866, a smelting furnace was built near Galena, in Washoe Valley, and run fitfully for a year or two.

Electrical and other methods, most of them fearfully and wonderfully conceived, have had brief trials at the Comstock. But all yielded to the Washoe process, which, working rapidly and neatly, and being so well adapted to local conditions, soon was in universal use at the lode.

(To be Continued.)

SULPHIDES.—The 1100 ounces of sulphides shipped to the Selby Smelting Works from the Holmes mine netted \$775 above all expenses. The sulphides came from 75 tons of refuse ore from the Holmes waste dumps, treated by the leaching process as an experiment. The success attending the first trial has encouraged the Holmes people so much that works having the capacity for treating 100 tons of ore per day are to be erected. There are fully 400,000 tons of refuse ore on the dumps, as well as immense quantities of low-grade ore in the mine that can be worked at a profit. It costs \$3 per ton to mine the ore and but 15 cents per ton to leach it.

A block of marble weighing 27,000 pounds was shipped from the Ioyo quarry last Thursday for the Mills building in San Francisco.

THE museum of the State Mining Bureau in this city was visited by over 26,000 people last year.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

CLINTON CONSOLIDATED.—*Ledger*, Feb. 7: Parties representing this company were in Jackson early this week, and paid to Eli Gardner, from whom they bonded the property they are operating on near Clinton, the sum of \$7500. Gardner thereupon gave them a full deed, taking a mortgage upon the property to secure the balance of the purchase price, amounting to \$13,000, which is payable on or before the first of June next. The closing of this sale indicates that the company are satisfied with the prospects of the mine, as indicated by several months' experience in crushing the rock. The company furnishes employment to about 50 men. It is, in fact, one of the most important mining enterprises of the county.

GOVER.—A rich chute of ore was struck on the 600-foot level of the Gover mine, the 28th ultimo. It was found by cutting back into the footwall about three feet from the east vein they had been working. They have cut into it some 10 feet and it shows an even grade of ore the whole distance. It is considered one of the most important developments made in the mine since its reopening, and ought to place the Gover among the leading dividend mines of the county.

BUNKER HILL.—Have their new hoisting works in successful operation. A. Knight's water-wheel is stationed at the mill 900 feet from the hoist, where, by a separate pipe line, water is brought to it as power. From here by endless cable the power generated by the wheel is transmitted to a friction gear hoist at their new shaft. This hoisting machinery is capable of going to a depth of 1500 feet. This is a most important undertaking by these people, and the shaft will develop a large portion of their claim never before prospected.

REAVES MINE.—Mill shut down and as soon as the new Eastern stockholders arrive preparations will be made to sink a shaft. Have a large well-defined ledge in sight, and in winze sunk on vein ore was nearly double the value of the surface rock.

FROM SUTTER CREEK.—Developments at the Rose mine are taking on more of a permanent aspect than at any time. Machinery is being moved on to it from a mine in El Dorado county, that has been abandoned there by Hayward. There is abundance of rock in sight, of very low grade. Hayward and Hobart are backing the enterprise with plenty of money, and operations are bound to continue for some time to come. The Belmont mine, formerly the Sutter Creek, is fairly organized, and operations are to start forthwith. J. H. Tibbets still has the management, and is going to lay in a supply of timbers, laggin, etc., right away.

Calaveras.

CUSTOM MILL.—*Chronicle*, Feb. 7: M. D. L. Wickham & Son, of West Point, have constructed a 5-stamp custom mill on Bear Creek. The mill will be ready to run in a few days. There are already some 50 tons of rock at the mill waiting to be crushed. The mill will be run by water-power.

QUARTZ.—*Mountain Echo*, Feb. 5: We understand that as soon as spring opens there will be a general revival of the quartz-mining industry in this locality, and that several of the mines that have been closed down for the past year or more will be reopened. That there are valuable mining claims in this vicinity, lacking only the means to develop them, no person familiar with this mining district can deny. We look forward with a hope of seeing much work being done on these different lodes, some of which are now bonded to men who mean business. Foremost among these is the Brunner mine, which, we are informed, will be reopened shortly.

MINING NOTES.—The work of running levels on the 600-foot station in the Stickle mine is going ahead steadily. The Gold Cliff mine is running full-handed. The mill is kept in motion day and night, and on the whole, the management is satisfied with prospects of this mine. Work is going on steadily at the Lane & Tuoloch mine, and the mill is running the full complement of stamps day and night. The Utica mine is again running in full force as of yore. The chlorine works are kept in operation constantly.

El Dorado.

VAN.—*Georgetown Gazette*, Feb. 4: J. W. Conan, who has been here since Saturday looking after his interest in the Van mine, accompanied by Supt. P. P. Tischer, left for San Francisco yesterday, for the purpose of securing hoisting works, mill, pump, etc., for the mine. With the exception of keeping the water out of the mine with the present pump, work has been suspended until the machinery arrives. A good deal of talk has been going on, relating to some differences existing between Newland and Conan, and it looks probable that some litigation may follow.

NUGGETS.—*Mountain Democrat*, Feb. 7: Dutchy, the long-haired man, has a rich channel in his mine, and is taking out some fine gold nuggets. Last Sunday on my way to Grizzly Flat, I saw the Ohio mill was running eight stamps, and was informed the mine was paying well.

Mono.

BENTON NEWS.—*Inyo Register*, Feb. 7: Encouraging reports come from up in the Benton section in regard to the mines thereabout. The ore in the mines being worked on Blind Springs Hill is generally of better character than ever before taken out. The Borrasso and Cornucopia are both being worked, the latter mine producing some good grade ore. Hoskins is working several men, and has enough ore in sight in his claim to justify an increase in working force which he is about to make. Parties working in Montgomery district have lately uncovered a four-inch ledge carrying an inch of incredibly rich ore, assays of this seam giving 13,000 ounces silver per ton. If this holds out in any quantity, its fortunate possessors will realize a fortune. The Montgomery section has produced small pockets of as rich ore as any region in the world, perhaps, and this news indicates that its days of production are by no means over. Blind Springs Hill, and in fact that whole section, carries mineral enough, without doubt, to make it one of the most notable mining sections in the West, the only

trouble being that the country was in the past ages apparently formed by building it of all the odds and ends of almost every rock known to geology. In consequence of the mixed and mingled character of the country rock, the ore is found in pockets. Its richness, however, is uniform, and this pocket work ultimately pays good returns. A governmental policy which will encourage silver production will, without doubt, inspire Benton with energy enough to again make it a large producer.

Mariposa.

COULTERVILLE.—*Gazette*, Feb. 7: Chas. Sutherland has returned from the city and will sink the main shaft on his mine near town 100 feet deeper. The owners of the Black Bart mine were in town this morning, making arrangements for a more systematic working of their mine. A big find was made on Quartz mountain a few days ago. The owners are very reticent as to the amount of gold taken out, but it is known that as high as \$100 a ton was taken out. Joe Metta has also struck a pocket near the Martin & Walling mine which has made him exceedingly happy. Joe Cuneo and his partner have also struck a pocket on their mine near Spring gulch, about five miles north of Coulterville, yielding some \$500 or \$600, with a fine prospect of doing better as they go down with the shaft. John Demartino has bought the interest of his partner, C. S. Benn, in the Southern Cross, Mountain View and Sweetwater mines, Mr. Benn having a call to go to Granada, Central America, to superintend some mines for a party of San Francisco capitalists.

Nevada.

THE EXTRACTION WORKS.—*Grass Valley Union*, Feb. 6: J. W. Higginbottom, manager of the extraction works, was in town yesterday for the first time in a number of weeks. He informed a representative of the *Union* that the favorable winter had been of great advantage in forwarding the work of construction, as it had permitted the getting of all the buildings under cover, and that no hindrance could now come to the setting up of the machinery, whatever may be the weather conditions during the spring months. All of the machinery has been received with the exception of the Krom rolls for crushing, which have been manufactured in New York and are now ready for shipment. A Bruckner furnace is now being set up, and stone foundations are being laid on which to set the tanks, which are large structures. The entire plant of the extraction works is being put up in the best manner and of sufficient capacity to handle the concentrates and ores that will be furnished by the several mining districts of this and adjoining counties.

W. Y. O. D. MINE.—*Tidings*, Feb. 3: The owners of the W. Y. O. D. mine will soon commence improvements on their mine which will place it among the best fitted-up mines in the district. The ledge both in the shaft and in the drifts is looking well, and the owners are confident of having one of the best paying mines in this district. So confident are they that a survey is now being made for a pipe-line to convey water to the mine to be used as power. The pipe will be 12 inches in diameter and will be connected with the Empire pipe, near the Empire mill. Four water-wheels will be put in and a new ten-stamp mill, with all the latest improvements, including concentrators, etc., will be erected. The owners are now negotiating for the purchase of the new mill. It is estimated that these improvements will cost \$15,000, and most of this money is now on hand to pay the expenses. The W. Y. O. D. is sure to come to the front as a gold-producer, and there are no more deserving miners in this country than the energetic and hard-working young men who have made the W. Y. O. D. what it is to-day by their indefatigable endeavors.

ANOTHER DIVIDEND.—The Idaho mine has not lost its grip yet by any means, as is shown by the manner in which dividends are regularly declared. Monday evening, Dividend No. 250 of \$2 per share, aggregating \$6200, was ordered paid to the stockholders of this famous mine.

EMPIRE MINE.—*Grass Valley Union*, Feb. 4: The old Empire mine is showing better at the present time than it has done for years previously, as the recent finding of a good pay shoot on the 15th level is found to extend down to the 17th level, and is holding its strength below that level. The ore is all of high grade and is giving excellent returns. This shoot is south of the shaft and goes into the slate formation, where it is not disturbed by any appearance of granite, which has at times broken up the vein to the north of the shaft. There is now every indication that the Empire is entering upon a new era of very profitable production which will last for a long time, as the company has a large extent of ground, and the deepest workings are showing the ledge to be regular in place and of good size. There are four distinct pay shoots in the Empire, all of which produce high-grade ore, and the quartz between the shoots is of fair milling quality. The full head of 40 stamps of the Empire mill are now kept constantly going, 25 of which are run on the ore from the pay shoots and the others on tribute and inferior rock. Supt. Starr is making a decided success of the Empire, which has been worked now longer than any other quartz mine in the State, as it commenced making a record in the year 1857.

THE CENTENNIAL MINE.—*Tidings*, Feb. 5: Another Grass Valley mine soon to be started is the Centennial mine, which was one of the earliest worked quartz claims in this district. In 1855 it was known as the John Judd claim and was profitably worked by that gentleman. A change in ownership took place in 1859, and a company named the Wide Awake bought the ground and erected machinery. This company worked the mine to a depth of 300 feet on the incline, the quartz paying a handsome profit. According to Bean's history of Nevada county, which is good authority, a crushing of 400 tons of ore yielded \$26,000, equal to an average of \$65 per ton. Not much work was done upon the mine from 1861 until 1876, in which year the ground was purchased by John Trenberth & Co., who organized a company and rechristened the mine the Centennial. Mr. Trenberth, as superintendent, worked the mine successfully for four years, taking out in all about \$200,000, from which yield a number of handsome dividends were declared. The lowest depth as yet attained upon the ledge is 600 feet, measuring on the incline, and the mine has produced in all, to its different owners, over half a million dollars in bullion. The property is now entirely owned by Mr. H. Silvester, who has bonded it to Mr. A. W. Stoddard for a term of two years.

MORE SPECIMENS.—*Grass Valley Union*, Feb. 8: Yesterday afternoon some very rich specimen ore

was taken from the Hartery mine and quite a lot of it was brought to town and placed in the Citizens' Bank. The general average of the ore at the Hartery is good and the specimens are found nearly every day. A bar of gold, amounting to about \$3000, was also brought to town, it being the result of a cleanup made to-day.

Placer.

ECLIPSE.—*Placer Republican*, Feb. 4: Fulweiler & Tabor, attorneys for the Eclipse Mining Co., have still further complicated the network of litigation in which the mine is involved by filing liens on the property for attorney's fees to the amount of \$750. The Cedar Creek Co. has given a contract to T. Bailey to run a prospecting tunnel in the Oak and Cedar drift mine at Dutch Flat. Mr. Bailey has begun work with a small force of men, and as soon as sufficient headway has been made he will work two shifts.

VALLEY VIEW.—*Placer Herald*, Feb. 7: The old Whiskey Diggins quartz mine, now known as the Valley View, which has recently been put in shape, and on which a Huntington mill has been erected, has made one or two runs, we understand, and the result is very satisfactory to the new owners. The margin of yield over and above the cost of mining and milling is said to leave a handsome profit to the investors.

Siskiyou.

QUARTZ AND GRAVEL.—*Yreka Journal*, Feb. 4: James Ironsides, who is interested in a quartz ledge on Cherry creek, Deadwood mountain, between Yreka and McAdams creek, has found a quantity of tellurium, similar to platinum, a very valuable metal, and sure indication of rich gold deposits wherever it is found. The ledge at present working is about five or six inches wide, but as the work of sinking down on it progresses, the ledge shows gradual widening, with prospects of proving a wide and valuable lode when thoroughly developed. The river miners on the Klamath are still working their claim, with prospects of not being obliged to pull out all winter, owing to the absence of rain and snowstorms to raise the stream. Not much work is being done this week, as all the Chinese companies and Chinese hands have knocked off to celebrate Chinese New Year. We hear that some very rich strikes have been found in the Salmon river district, near the Black Bear mine, one of which, the richest of all, having been accidentally discovered by a lady while out walking with some friends. The miners at Oro Fino and Quartz Valley are anxiously awaiting rain and snow to furnish water, not having been able to start work yet in their claims, in consequence of no water in the ditches. Several good quartz ledges have also been found lately in these two districts, which are now being worked by the discoverers in developing them. Jilison & Co., at Cottonwood, have completed arrangements so as to commence drifting on the blue lead in their claim, and expect to take out blue gravel on an extensive scale during the coming spring, with certainty of rich reward, as all the blue gravel, thus far prospected, has paid exceedingly rich. A new ledge of quartz was discovered last week at the head of Greenhorn creek, between the north fork and the main creek, by parties from Cherry creek, whose names we have been unable to learn at present. The ledge has every appearance of being permanent and prospects exceedingly rich, a piece of the quartz of the size of a man's fist yielding \$3 on being pounded up in a hand mortar.

BIG HOPES.—*Siskiyou Telegram*, Feb. 7: The owners of Lash & Co.'s mine on Lee's place, on Greenhorn, still have big hopes for a bonanza. Some days ago the bedrock took a jump for the hill, necessitating the digging of a bedrock vein four feet deep and 80 feet long. Big pay is expected when they are able to proceed with the work again.

Tuolumne.

STILL ON DECK.—*Union-Democrat*, Feb. 7: "Played out," "gone in," "no more gold there." These expressions greeted one on every hand a month ago whenever the Bonanza mine was brought into discussion. She now hobs up smilingly and says "ain't you tooling," and shakes her golden treasures from her earthy bed to the tune of \$14,000 and promises faithfully to send another shower ere the scorching summer sun beats down on her surface. It is plainly evident that the Bonanza intends to keep up her reputation, and her practical and energetic workers are going to assist her in doing so. The recent strike in this mine is encouraging both to the owners and to Sonora.

THE BONANZA STRIKE.—*Tuolumne Independent*, Feb. 7: The reports of an immense strike in the Bonanza mine, in town, have been greatly exaggerated. For a month past they have been getting very fair prospects from \$50 up, and a week or 10 days ago they got a pocket of about \$70,000. This was all crushed last Friday and Saturday and will clean up between \$12,000 and \$13,000, the gold assaying \$18 to the ounce. There is no indication of a pocket at present. They are making a crosscut west to strike the west crossing. The expense of running the mine since striking the last big pocket has been about \$30,000, so it will take considerable more than this last find to make the boys even.

NEVADA.

Washoe District.

CON. CAL. & VA.—*Virginia Chronicle*, Feb. 7: 1100 level: Making good progress in cutting out the shaft station, which will be completed the coming week. 1200 level: Continue to extract some milling ore from above the line of drift run south from the east crosscut No. 1 from the south drift from the shaft station. 1300 level: Continue to extract some ore from the point where the upraise carried up from the end of the east crosscut from the south drift connected with the fourth floor stopes. The east crosscut from the shaft station (Con. Va.) has been extended 40 feet; total length, 65 feet, continuing in porphyry. 1500 level: The ore which is exposed in the opening 43 feet above the sill floor of this level now shows a width of nine feet on the eighth floor and continues of good quality. 1600 level: Continue to take out some ore along and above the line of the drift run east through the old stopes on the sill floor of this level, also from the stopes which we are running southerly from that drift. Continue to stoop out ore at a point 200 feet south from the north line of the California ground and 44 feet above the sill floor of this level. The quality of the ore has improved and will show an average assay value of \$33.50 per ton. 1650 level: Have continued to extract the usual quantity of ore

from the various openings. From the bottom of winze No. 2 sunk from the south drift on the east side of the vein down to the south drift on the 1750 level we are now working upward in forming a second compartment to the winze. No. 3 was started and has been sunk eight feet through the timbers of old ground which contained milling ore. There has been extracted from all parts of the mine during the week 1568 tons of ore which was shipped to the Eureka mill. The average assay value of all the ore worked at that mill during the week (1575 tons) was \$22.50 per ton. Bullion shipped to the Carson Mint, assay value, \$59,501.04.

OPHIR.—Upraise started from the west end of the drift run north from the drift run west from the winze, 122 feet below the sill floor of the 1300 level, has been carried up eight feet. From the top of this upraise a west crosscut has been advanced 14 feet in quartz of low assay value.

MEXICAN.—East crosscut No. 1, 1465 level, started from the north lateral drift at a point opposite west crosscut No. 1 has been extended 27 feet; total length, 402 feet, passing through a softer porphyry formation.

UNION CON.—The east crosscut No. 2, 1465 level, started from the north lateral drift at a point 200 feet north from the south boundary line of the mine, has been extended 29 feet; total, 545 feet, continuing in a formation of porphyry and clay.

YELLOW JACKET.—Shipping 50 tons of ore daily, assaying \$18 per ton, battery assays. We are doing extensive prospecting work.

JUSTICE.—The north drift, 322 level, has been advanced 22 feet during the week and is now out a total distance of 271 feet; face in hard rock. The south drift from No. 1 winze, 490 level, was advanced 21 feet the last week; total distance, 113 feet; face in fair-grade ore. Shipped 153 tons of ore worth, as per battery samples, \$17.07.

KENTUCK.—The 250 raise was continued 5 feet during the week and then stopped, pending the completion of the connection between the 950 winze and 1000 raise. The raise in the east ledge on the 1000 level has not been advanced, as it will be necessary to bring in air there before going farther. We are now engaged on that work. The 1000 raise in the west ledge was advanced 7 feet during the week, making its height 14 feet. It will connect in a few feet with the bottom of the 950 winze. Started a north drift from the bottom of this raise, which is in 14 feet from the main east crosscut. The face is in quartz, with spots of ore in it.

CROWN POINT.—The northwest drift on the 500 level has been stopped, and at a point 120 feet in we have started a west drift, which is out 18 feet. The face of the drift is composed of quartz and porphyry.

CON. IMPERIAL.—Work is still being confined to following up and taking out small streaks of ore on the upper level and overhauling the old stopes of the mine.

SEG. BELCHER.—The 600 level, south drift, has been extended 26 feet during the week, and is now out 155 feet; the face is in soft porphyry.

OVERMAN.—Have extracted 385 tons and 1200 pounds of ore. Shipped to the Brunswick mill 387 tons of ore. Battery assays average \$14.75 per ton. Upraise from the northwest drift on the 1100 level has been extended 12 feet, passing through ore; total length, 153 feet. Upraise from south drift has been extended 16 feet; total length from the track on the slope, 173 feet; formation, quartz, carrying ore of a fair grade. Incline upraise on eighth floor of 1200 stoep has been advanced 21 feet through quartz of a low grade; total length 34 feet. On 1000 level south-west drift has been advanced 25 feet through porphyry; total length 167 feet. On the 850 level south drift has been advanced 28 feet through porphyry; total length, 332 feet.

CONFIDENCE-CHALLENGE.—The north drift on the 300 level is in 172 feet. The face shows quartz having no value. This drift is 41 feet in Confidence ground. The east crosscut from this drift is out 28 feet. The face shows clay. This crosscut has been stopped for the present. The joint Confidence and Challenge raise from the 750 level is up 154 feet. The top shows quartz having no value. The Confidence and Challenge west crosscut from the north drift on the 1100 level is out 139 feet. The face shows quartz having no value.

SAVAGE.—Milled 530 tons of ore, the average battery assay of which was \$14.80 per ton. Bullion on hand, \$25,188.40. The north upraise from the 300 level is carried up 87 feet; top in low-grade ore. On the 400 level the intermediate east drift was extended 20 feet; total, 40 feet. On the 500 level No. 2 a north upraise is advanced 30 feet, following the ore. The north stopes from this level are connected with the same floor north on the 400 level. On the 1300 level east drift was extended 19 feet; total, 126 feet. At a point in the winze 75 feet below the 1300 level are cutting out a station for an intermediate level and are extracting ore.

HALE & NORCROSS.—There is no change in the formation in any of the drifts since last report. We have men on repairs in the main shaft and wherever necessary on the different levels.

ANDES.—During the past week north drift, 420 level, was extended 16 feet through a formation of quartz and porphyry. East crosscut from south drift on 420 level was advanced 10 feet; face in clay and porphyry.

CHOLLAR.—Winze 80 feet south of north line, 750 level, is down 55 feet, bottom in clay and quartz. The station from 1400 level is in 17 feet. Repairs to the head incline are nearly completed. Extracted and sent to the mill the past week 542 tons of ore, the battery assays of which are \$16.05 a ton.

POTOSI.—The winze is down 24 feet below the 1300 level; bottom in porphyry. The north lateral drift, 1300 level, is out 237 feet; face in porphyry. East crosscut from winze, 1300 level, is out 150 feet. It has passed through 12 feet of quartz yielding low assays.

EXCHEQUER.—The east crosscut near the south line, 600 level, is out 291 feet; face in porphyry. East crosscut on the north line, 600 level, is out 65 feet; face in clay and quartz.

WARD COMBINATION.—The east drift from shaft, 1800 level, is out 820 feet; face in hard porphyry.

SILVER HILL.—Northeast drift, from the winze on 160 level, is out 625 feet; face in hard porphyry.

UTAH.—Northwest lateral drift from the main west drift from the shaft, has been extended 35 feet; total length, 494 feet, in a porphyry and clay formation.

NEW YORK.—East crosscut 100 feet north of shaft, 1000 level, is out 52 feet; face in clay and

quartz. East crosscut 200 feet north of shaft, 1100 level, is out 19 feet; face in porphyry. East crosscut 200 feet north of shaft, 1100 level, is out ten feet; face in clay and porphyry.

OCCIDENTAL.—During the week the work in the mine has been confined to repairing and retimbering the main tunnel to the 550 level.

SIERRA NEVADA.—Northwest drift from the shaft station, 630 level, has been extended 45 feet, total 451 feet; face in hard porphyry.

Jett District.

SENATOR.—Belmont *Courier*, Feb. 4: Thomas Warburton was at Jett, Nye county, last week and inspected his mines which are located in that district. He informs us that the Senator mine is looking splendid. The ledge goes down almost perpendicularly and it has already been followed a distance of 100 feet, and the vein is widening as depth is attained. Mr. Warburton brought to Belmont a few pounds of ore extracted from the Senator lode and had some of it assayed. Following is the result of the assay: Silver, per ton, 90 1/2 ounces; gold, \$3.25; lead, 43 per cent. It is well known that rich ore exists in that portion of the Toiyabe mountains, and whenever the American Congress decides to pass a Free-Coinsage bill, the owners of mines in that locality will undoubtedly resume work on their properties.

ARIZONA.

WALKER DISTRICT.—Prescott *Courier*, Feb. 6: N. L. Griffin is running the Dixie mill on gold ore that was once thought to be n. g. He makes this ore pay about \$8 a ton. He took out \$200 the first four days. Will crush richer ore as soon as he gets rid of the "waste" dump. A number of Frenchmen are mining good silver ore out of the Amulet. They have a lease.

BIG BUG DISTRICT.—Jack Owens has just taken a wagon-load of supplies to his mine in the above district. He told a friend that he had considerable ore that will mill between \$400 and \$500 a ton, gold. Other men say it will pay much better, but Jack is modest. Frank McCabe is shipping gold ore from his Gladstone mine. J. F. Blandy, M. E., arrived from Big Bug recently. From him we learn that the railroad is finished as far as Big Bug creek. It will not take the company long to send it to the Hackberry mine, and may be, farther. Two mills are being run in Hassayampa district, namely, the Senator and Rapid Transit. John McDonald, John Sugden, P. A. Craigie and other miners are working hard, with good success in the Slate Creek portion of the district. R. W. Groom, who has been mining in this county since 1864, has developed a group of mines near Wickenburg, which are well thought of. Mike Ryan, Tom Roach, John Holmes and others are raising shipping ore out of the Turkey Creek district mines. In Bradshaw, the Tiger and Crowned King are producing plenty of ore. Tip Top district miners ship from \$10,000 to \$25,000 worth of silver ore each month. We judge that Castle Creek miners are doing well, because some of them who recently went down to the capital were relieved of "rolls." Wagons with shipping ore are en route to the Prescott ore works from the Hillside country. Mines near Skull valley are panning out well. Mines near Cordes Station, Black Canyon road, are furnishing shipping ore. Water is not as plentiful as owners of hydraulic mines would have it, but they continue to harvest gold.

C O D.—Mohave *Miner*, Feb. 7: Steve Tyler was down from the C O D mine with a carload of ore from his lease. This ore was extracted by two men in a month and will run over \$100 per ton. This is a pretty good month's work and is a fair sample of returns to many chlorides operating in Mohave county. The Rip Van Winkle tunnel cut a great many small strings of rich ore, and the drift is now being run on ore rich in native and ruby silver, and considerable ore is being placed on the dump. The drift will soon be under the main ore body and then a number of men will be placed at work stopping. Work on the Last Resort mine near Mineral Park is progressing and much rich ore is being extracted. The streak of ore runs about four inches in width and yields about 2000 dollars to the ton in gold and silver. The south drift of the Indian Boy is in two feet of solid ore of a high grade. The ore is heavy lead carrying a good deal of gold and silver. Stopping will be commenced next week and the output of the mine will be increased to about two carloads of ore per week. The ore chute is about 80 feet in length and about 2 feet in width of solid ore. The ledge is the largest of any in the county, the crosscuts having encountered no walls.

SOME FINE ONYX.—Phoenix *Herald*, Feb. 6: Crowds gathered in front of Barnard's saloon to-day to see the wagon-load of onyx brought in from Woodson, Holmes & Barnard's recently-discovered mine at the head of Cave creek, about 50 miles south of Adjutant-General O'Neill's famous deposit. J. B. Braswell brought in the load, which comprised two large slabs, one 5 1/2 feet long, 12 inches wide and 14 inches thick. The two weighed 1700 pounds. A broad, green surface on the oval piece indicated that the genuine onyx had been found. It was so declared by Mr. Braswell's brother, an expert from Tennessee quarries. The owners have three claims located, embracing 20 acres each, out of which crops for 600 yards a ledge calculated to be 40 feet across. It dips into the mountain at an angle of 30 degrees. Charles Coon is fitting up polishing machinery and will manufacture commercial onyx as ordered from this ledge. A new road for six miles is needed to reach this property. Geo. W. Barnard will contribute liberally in onyx toward the expense of building it. Eight years ago Mr. Haydon surveyed an easy road grade through these claims. From Cave creek across Agua Fria is the only had part of the route. Thence to Prescott, taking in the Senator and other mines, there is not a single mountain to be crossed. The onyx claims of Woodson, Holmes & Barnard alone may induce railroad building just to reach those undoubtedly valuable deposits.

BRITISH COLUMBIA.

NOT EXAGGERATED.—Nelson *Miner*, Feb. 3: The reports from the Silver King are in no way exaggerated. The tunnel is in solid ore, that from the east wall assaying from \$200 to \$600 to the ton in silver. The face of the tunnel was sampled and gave a return of over \$100 to the ton. There is no question but that the ore-body through which the tunnel is now running is the same as that in the

crosscut from the shaft, as the shaft is now not more than 50 feet distant from the face of the tunnel. The crosscut was over 45 feet in length, with neither wall in sight, and the miners who put in the last shift unreservedly state that the ore blown out by the last shot was as good if not better than that previously taken out. The ore from the crosscut was shipped without sorting this fall, and if every man in the country is not a blundered liar, its value in silver and copper was \$414 to the ton.

COLORADO.

THE MOLLIE GIBSON.—Aspen *Times*, Feb. 6: The Mollie Gibson bonanza is increasing in importance as work progresses. The rich ore body on the fourth level is described as a wonder. It is from five to seven feet thick and grows with each day's development. Ten tons of the first-class ore sampled at Taylor & Brunton's yesterday returned 2200 ounces per ton. This includes all of the high-grade, the original plan of dividing it into two classes has been abandoned. The second-class ore runs about 700 ounces per ton, and there is a large quantity of this. Parties interested in the property begin to assert that it is destined to eclipse the Aspen. The value of the property does not depend entirely upon this rich chute in the fourth level, as the property would be a bonanza without it. Some weeks ago a body of good ore was opened in the third level south of the incline. During the past two or three days, this level has developed a large body of galena ore that runs high in silver. This chute is spoken of as being one of the most important features of the mine. The ore is rich enough to be very profitable, and is in such large quantity that it will furnish a heavy tonnage.

THE ROCK CREEK COUNTRY.—The Silver Crown has at last struck the contact through the big crosscut tunnel at a depth of 525 feet. Blue line has been encountered carrying considerable gray copper and of the same character as that found in seams on passing through the porphyry footwall, which gave assay returns of 800 ounces silver. William Newman is pushing work on the Caledonia and High Tower crosscut tunnel and is now in a depth of 115 feet. Considerable mineral is being found, though shaken up and out of place. It is estimated that another 100 feet will cut the contact carrying the rich mineral found in the old workings of the Acme and Leviathan which gave assays of 5000 ounces silver. The Hecla is another valuable group and embraces the Hecla, Calumet, Aspen, 1890, Log Cabin, and Big Four claims. It is owned by O. H. Schen, J. E. Chaney and others, and is being worked by a crosscut tunnel now in a distance of 200 feet, and it will be necessary to drift 200 feet farther to cut the big contact that swings across the gulch to the north, opposite Newman mountain on Breese hill. Indications point to a busy and prosperous season for Avalanche, Newman mountain and vicinity, and good paying mines are things to be expected in the near future.

IDAHO.

BIG MUDDY.—World, Feb. 7: Wm. Sweet has got in timbers and is otherwise prepared for carrying on work uninterruptedly on one of the group of mines at the head of Big Muddy. Mr. Sweet has begun the work of sinking a shaft. He will go to the depth of two or three hundred feet, and with this development he will determine whether it will be good policy to tap the mines at great depth from Payette side. If the mine continues down as it is at the surface, a tunnel will be run to tap the ledge at the depth of 800 or 1000 feet. The Elmira Co., at Banner, has turned out 170,000 ounces of silver in the last 170 days. Their mill is a ten-stamp.

QUEEN OF THE HILLS.—Salt Lake *Tribune*, Feb. 5: Fulton Haight, superintendent of the Queen of the Hills mine, Bellevue, Idaho, is in the city. Regarding the Queen of the Hills, he says they are employing 30 men in doing development work chiefly. Drilling is being done on the vein at a point 400 feet below the Lusk, or working tunnel. About 400 feet of drifting has been done on the vein at that depth, besides many crosscuts to explore the country. The mine is looking well. The Minnie Moore is being worked by leasers, some 15 or 20 men being engaged, and they are doing well. Water in the mine has risen above the 500-foot level. "I learn," said Mr. Haight, "that the Modoc is looking fine, and ore is being extracted and shipped." On the Michigan vein is being drifted upon at the 366-foot level and is looking very promising, there being considerable iron in the vein. The Hillside is a new mine near the Modoc, and it is being worked by leasers who are taking out ore that runs about 100 ounces silver and 60 to 70 per cent lead. There are two or three promising prospects at the head of the Minnie Moore gulch which are being developed by their owners. Several other good prospects about Bellevue promise to develop into mines soon. Mr. Haight said he knew but little of the mines in other parts of Wood River, but he understood that the Red Elephant, being worked by Colonel Byron, and the Red Cloud were doing nicely, and that the Idaho Democrat, being worked by J. O. Swift, is promising well. "How about the raise in freights?" asked the reporter; "how is it going to affect that country?" "The raise amounts to nearly \$5 per ton in the way of increased freight and other charges, and this is enough to injure the country very much, if it does not cause the shutting down of the mines."

MONTANA.

EIGHT HOURS.—Butte *Inter-Mountain*, Feb. 4: The miners of this camp are still interested in the 8-hour proposition and it still forms a popular topic of conversation with them. From the first they have been disposed to treat the subject in a most conservative manner, and that disposition is still to be seen in the manner of their discussions. There is no thought of forcing the new measure, but hope seems to be that its wisdom may be acknowledged, and so much of a concession made without anything like agitation. Since the Legislature has been organized they have been hoping that a law may be passed granting them at least a measure of relief, but the steps to bring that about have been so quietly taken that really little is known regarding their action outside of the order. The practice with the Anaconda Co. is to work the men ten hours on day shift and nine hours at night. On Saturday nights they are given one hour as sort of

partial holiday. In a general way this plan is followed by most of the big companies, some of them giving more and some less of the Saturday night. The Saturday day shift in most of the mines is remembered with the gift of an hour or at least with some extra time. It is understood that the presidents of the Butte and Granite Miners' Unions are in Helena looking after the matter of legislation, and that they hope to obtain some relief before the winter is out. Another matter that is being discussed among these hardy underground workers is making the office of mining inspector elective. This measure has many friends and will doubtless be brought forward for consideration before spring.

THE BOSTON & MONTANA.—The forces employed in the mines of the Boston & Montana Co. have been reduced during the past week to some extent. These mines have been developed to such an extent that it is stated the Mountain View alone has ore sufficient in sight capable of keeping the present hoisting plant busy for a period of ten years without interruption or further development. All now depends on the completion of the large smelter at Great Falls, when work on all of these great mines will resume on a basis never before experienced in the history of this camp.

THE EMMA NEVADA was visited during the past week by President Brophy, accompanied by Messrs. Largey and Hellican. The main tunnel is in 200 feet, and on the pay chute a distance of 80 feet. They report a high grade of chloride ore, several samples of which are on exhibition at the office of Rickards & Lewis, West Granite street. It assays 1000 ounces in silver and \$18 in gold. The lead from which this rich ore comes runs from 4 to 18 inches in width. The north ledge which is worked from the bottom of the 50-foot shaft runs in the bed of the creek and is from six to eight feet in width. From it several cars of rock have been shipped to this city for reduction. The level from the bottom of the 58-foot shaft is in 132 feet, 98 feet of which is in pay ore.

UTAH.

A FORTY-THOUSAND-DOLLAR SALE.—Salt Lake *Tribune*, Feb. 7: George S. Smith and wife have sold to John A. Van Pelt the Extension and other mining claims in West Mountain mining district for \$40,000. The deed went on record yesterday.

TINTIC AND THE U. P. GROUP.—John F. Stringer has returned from a visit to Tintic, where he took a look at the Union Pacific group and the Iron Duke. In the Union Pacific group a tunnel is being run in on the Young Miner claim, and has reached a distance of about 80 feet, getting to a depth of about 50 feet below the surface. The ore found there assayed 25 per cent lead and about 60 ounces silver. This is in porphyry, but there are indications that limestone is not far off. This is believed from the fact that in the tunnel there are cracks crossing in which the sides are coated with lime crystals. The company has a carload of ore in the bin which will run about \$80 a ton. The Iron Duke is improving as work pushes ahead, and the streak of ore is widening until the pay is now two feet wide and assays about \$50 per ton. Mr. Stringer said he had to sleep in an orehouse one night because there was no other accommodation in Silver City which had not been taken, but this state of affairs will not last more than ten days longer, because the hotel building by Condon Bros. will be open by that time, which will certainly be an important event for that portion of Tintic district.

AT CAMP FLOYD.—Salt Lake *Journal*, Feb. 7: From Mr. R. L. Scannell, secretary of the Mercur Gold Mining and Milling Co., whose works and mines are located in the Camp Floyd mining district, we learn that it is the intention of the company to start their mill in a week or two, or as soon as the weather will permit. The character of the ore in this mine is red oxide of mercury, and yields, on an average, assays of from \$20 to \$37 in gold to the ton. The magnitude and wealth of this property can be somewhat appreciated by the statement that the extent of the ore body has not yet been determined. The shaft is down some distance in solid ore, several drifts have been made without reaching the limit, and the miners are now working in a tunnel, that is in a distance of 300 feet, all the way in solid ore. Thus it can be seen that, although the ore is low grade, it is an enormous proposition, especially when it is remembered that, besides the gold, quite a large per cent of quicksilver will be saved in the reduction of the ore. There are now a thousand tons of ore at the dump at the mine, and the ore-bins at the mill are full. The milling is novel and exhibits some new features in ore reduction.

WASHINGTON.

CONCONULLY.—Okanogan *Outlook*, Feb. 7: The coming season promises to be one of much greater activity than any yet experienced in the camp, and the mild, open winter we are having will have the effect of commencing operations about two months earlier than last season. A change for the better is already noticeable in the number of sales of mining and other properties recently made, and on all sides active preparations are being made for the employment of increased development forces and the opening of new mines. Jack Waters sold one of his Lime Belt prospects to Geo. Pfunder this week. F. S. Hinds and Geo. Cooper started a new drift on the Okanogan Belle this week. Henry Lawrence and Wm. Hunt went up on Mineral Hill the first of the week to commence work on the Mohawk. Ben Gubser has been working in the tunnel on the Trade Dollar claim, just above town, for the past two weeks and is taking out some very good-looking ore. Geo. Pfunder is said to have secured a bond on some valuable mining property in the Wanacut Lake district. Wm. O'Neill visited Palmer mountain this week and reports that miners and prospectors are hopeful and confident of a season of activity in mining operations in that district, and not a few are getting in shape for a big season's work. While on the mountain he visited the Leadville mine, on which John Judge, the owner, is doing some development work. A shaft is being sunk on the vein and is now down 20 feet. The ledge thus exposed has increased in width from two feet at the surface to four feet at the bottom of the shaft. Some of the richest gold ore ever found in the camp has been taken out of this shaft, and the mine is considered one of the best properties in the district.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING FEB. 3, 1891.

445,742.—SHINGLE AND SHAKE MACHINE.—Chas. W. Babcock, Crescent City, Cal.
445,828.—SEPARATING CROSS-HEAD TIE-WIRES.—G. B. Baer, Cloverdale, Cal.
445,747.—STRIKING BAG.—H. B. Cook, S. F.
445,750.—LETTERING DEVICE.—L. A. Gates, S. F.
445,729.—STOVE TOP.—Peter Haerst, S. F.
445,892.—WATER-CLOSET.—J. M. Holloway, Santa Barbara, Cal.
445,753.—FRUIT-PITTER.—James T. Ish, S. F.
445,837.—PNEUMATIC BELL.—G. F. Kincaid, S. F.
445,730.—AX-HELVE FASTENER.—H. M. Martin, Tacoma, Wash.
445,818.—SHEAVE.—Thomas O'Neill, S. F.
445,910.—ELASTIC FENDER FOR VESSELS.—G. O. Stein, Pioche, Nev.
445,856.—CLOTHES-HANGER.—E. Sundberg, Eureka, Cal.
445,612.—SELF-CLOSING GAS BURNER.—W. Ten Eyck, Oakland, Cal.
445,579.—VAGINAL ATOMIZER.—W. E. Weldon, S. F.
18,930.—TRADEMARK.—R. D. Hume, S. F.

The following brief list by telegraph for Feb. 10, will appear more complete on receipt of mail advices:
California.—Lewis M. Clement, Oakland, cable street railway; Julia W. Craig, San Francisco, chair; Peter H. Jackson, San Francisco, lens for illuminating tile; Ammi M. Jewell, San Francisco, boring machine; Edwin McDonald, Wilows, thrashing machine; James F. Waite, San Francisco (assignor of half to William Hollis), brake for cable-car.

Note.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS-U. S. and Foreign Patent Agency, the following are worthy of special mention:

STRIKING-BAG.—Hiram B. Cook, S. F. No. 445,747. Dated Feb. 3, 1891. Striking or exercising bags are usually made with an outside case of leather and either filled or comparatively heavy or with an inner rubber bag having a pipe or tube by which the bag may be inflated so as to fill the exterior case, making either a heavy or a light bag which is suspended by a cord from the ceiling in such a position that the operator can strike the bag, causing it to swing, and as it returns or rebounds to strike it again, and in this manner use it for exercising purposes. The exterior cases as usually constructed are made of seven or eight segments, the edges of which are stitched together and they are provided with a loop or strap stitched upon one side to which a cord is attached so that they may be suspended from the ceiling. A swivel hook forms the connection between the upper end of the suspending strap and a hook or eyebolt which is screwed into the ceiling, the swivel necessarily hanging some distance below the fixed hook and swinging as the bag swings. By this construction, when the bag is struck the swivel swings up against the ceiling, making considerable noise and in time wearing the ceiling out, besides which the eye-bolt very soon becomes loose and a new hole has to be made for it. The strap to which the cord is attached being secured at only one or two points, pulls the bag out of shape and is also soon torn loose from the bag by the violent wrenches upon it, and when the seams in the bag become ripped, as they soon do, it is very difficult to repair them. In Mr. Cook's invention the bag is made preferably in four sections and these sections have their edges cut so as to abut squarely against each other and they are then sewed together by an over-and-over seam which leaves the edges abutting squarely so that both outside and inside of the bag are perfectly smooth. This prevents the rapid wearing out of the interior rubber bag when one is used and presents a smooth surface upon the exterior for the hands to strike against. Each section has a strap riveted into the end of the section and a re-enforce of leather is stitched down over them. These suspending straps pass out through slots in this re-enforcing piece and the ends are all brought together centrally and firmly secured to the suspending cord. By this construction each of the sections has an equal strain brought upon it and each section is equally secured and suspended, and when used with the rubber bag they form a space between them within which the tube for inflating the rubber bag is safely protected. The eye-bolt to which the upper end of the suspending cord is attached has its shank extending vertically through a fixed countersunk plate with a nut or head upon the inner end whereby the eye is allowed to turn freely. The point of motion is thus brought close to the ceiling and no swivel is necessary. There is no noise caused by the swinging of a swivel against the ceiling. The bag and cord move together, and as there is no weight of iron at the upper end of the rope to swing with the bag, the motion of the latter is made more smooth and even and the life of all the parts is greatly extended.

STOVE-TOP.—Peter Haerst, S. F. No. 445,729. Dated Feb. 3, 1891. This improvement in stoves consists in a rotary disk or plate through which the holes are made for the utensils which are used upon the top of the stove—this plate being capable of revolution around a vertical axis so as to bring either of the holes to the front or rear to change the position of the utensils with relation to the fire. It also consists in a means for closing either of the holes temporarily from beneath while a utensil is being removed so as to prevent the escape of smoke and products of combustion.

SHINGLE OR SHAKE MACHINE.—Chas. W. Babcock, Crescent City, No. 445,742. Dated Feb. 3, 1891. The object of this invention is to provide a machine for operating upon two bolts, one on each side of the machine.

MECHANICAL PROGRESS

The Demand for Power.

Statistics show that four-fifths of the total horse-power of the steam engines now in operation has been produced in the last 25 years. Although the increase has been considerable in this short time, it is not to be wondered at if a little thought is given to some of the conditions that have made it possible, principally the larger extent of country that has been opened up during this time and the increased facilities for doing business that have been introduced. As the efficiency of engines and boilers has been increased, the cost of operating them has been reduced to such an extent as to make them available in many places where a more expensive motor power would leave no margin for profit, and consequently no occasion for the opening of a business. The facilities for doing business have been increased in even greater proportion in the same length of time, and that of itself has called for increased power for the development of natural resources and the products of the manufacturer. There will always be a large demand for all things which are or may be made useful, and any improvement that will cheapen the cost will be the means of creating an increased demand as it is brought within the reach of a greater number.

Many things that were formerly made by hand are now manufactured by machinery, and the operation of machinery requires power. As natural sources of power are not always conveniently located, transformers of power are found more convenient and far more reliable, so that by their use the factory can be located in any desirable position and the power brought to the factory. This has been found the cheapest and most reliable method, for where the power is under control it can be relied on at all times, but the same cannot be said of the natural powers, for they have a faculty of falling below the requirements just at the time when the use for them is greatest. This has been shown in the use of water-power for milling purposes. Most of the leading mills have introduced engines and boilers, even when located near some of the best water-powers.

Competition and an increase of business has made the use of reliable power an absolute necessity, and steam has been the only thing available. In some cases it has been found that steam, when used in connection with a high-duty engine, was, taken altogether, the cheapest source of power, and the spectacle has been witnessed of a mill fitted with water-power machinery, built over a race through which an abundant supply of water was running to waste, while the mill was being operated by steam.

The Use of Electricity.

Then the introduction of electric lighting and the use of the electric current for the production of power, has created an increased demand for steam engines; and the fact still remains that the cheapest and most convenient method of producing electricity (when water-power is not available for that purpose) is by the use of the steam engine. The rapidly-increasing use of electricity for power purposes only increases the demand for steam engines of larger size and greater power, and the electric motor being cheaper, more convenient and less troublesome than small engines, is being introduced in many places where it would be impossible to establish a satisfactory steam plant. Then every electric motor put to service will require for every horse-power that it develops very nearly two-horse-power of steam engine to operate it, so that from present appearances there is little probability that the demand for steam engines will perceptibly decrease; but on the contrary, another 25 years will probably show as great an increase over the present as the last 25 years have shown. Even though some of the wonderful methods of producing electricity, that have been heralded lately, should be made practical, the steam engine would still be in demand.—*Stationary Engineer.*

FORGING STEEL BY HYDRAULIC POWER.

Hydraulic forging presses are now in operation all over Europe, and are effecting a complete revolution in the working of large masses of steel. What used to be considered wonderful results in the forging of iron by means of the Neumath hammer, are now quite put in the shade by the hydraulic forging presses of immense power produced at the Goodman-street Engineering Works in Leeds, whence was provided, not very long ago, the first large forging press that ever was made, and which is now in full work at the armor-plate manufactory in Sheffield, of Messrs. John Brown & Co. It is of 4000 tons, and is worked by 2000 horse-power pumping engines, and commanded by power-traveling cranes capable of lifting 150 tons. At the works of Herr Knapp, and at those of Schneider & Co., in France, similar presses are now at work, and one has been erected at the Terni works in Italy, whence the forging of guns and armor-plates is largely carried on. A 4000 ton press, ordered by a Châtillon company, has been delivered, and is now in course of erection by the Leeds firm. As showing how widely the use of hydraulic power is being adopted, because of its vast capability, it may be mentioned that Tannett, Walker & Co., of Leeds, are putting down for

the Midland Railway Co., at their goods stations in Birmingham and Leeds (both of which are undergoing large extensions), a hydraulic plant whereby more facility than heretofore will be obtained to deal with the immensely increasing traffic.—*London Iron.*

HAMMERING is a wonderful process. It is an ingenious and simple means of exerting a great force in any direction, and without it many arts would cease; but it is carried too far in iron-forging. Hammering is suitable only in cases where the work is to be done "quick," and this does not apply to the heavy forgings of our time, and to no forgings, if we could employ presses instead. A steel-making firm in England is about to put down a press of enormous capacity. The tool-makers have to make certain parts on the ground, because they cannot be transported. One piece weighs 85 tons. Cammel, at Sheffield, has a press of 45,000 tons capacity that has been in use about four years doing good work. In hammering heavy masses, the inertia of the piece prevents any effect on the anvil side, and also penetration on the top side, unless the hammer is heavier than the work.—*Industry.*

SHEET IRON MOUNTING FOR BLUE PRINTS.—A well-known Eastern manufacturing company is using in its shop thin sheet iron as a mounting for blue prints, and it is proving very satisfactory. It is cold rolled, has a smooth surface, and is cut into two different sizes for blue prints used in the shop. It is practically indestructible, quite light, and inexpensive. The iron is first varnished on both sides with shellac varnish, then the blue print is put on with a paste composed of ordinary starch, after which the face of the print is varnished with the shellac. The chief draftsman says he experimented with a good many kinds of paste before finding a satisfactory one, and that starch is the only thing found that would answer. He also found that, unless the iron is previously varnished, it oxidizes under the print and spoils the lines.

THE MANNESMAN PROCESS.—Our contemporary, *Industry*, of this city, comments as follows on the Mannesman process of rolling tubes: This process, unless a good deal changed, will, in our opinion, prove more interesting than useful. The enormous resistance offered by the blank in its passage through the rolls may be overcome by storing up power in wire-bound fly-wheels, but how are the rolls, gearing and framing to endure under the strains? Not only has the roll gearing to withstand abnormal strain, but must be yielding in two planes. The ordinary processes of rolling metal, hot and cold, with parallel rolls, taxes the endurance of bearings, gearing and framing to their utmost; and to double this and at the same time increase the speed to 300 revolutions per minute, is going beyond a practical limit.

ENGLISH OR AMERICAN STEEL?—English sois are still called for by ladies, but tailors and others using scissors in their daily work have long since ceased to look for the Sheffield mark. This is very significant, and the fact that an English tailor insists on American-made shears is a great clue upon us, as the very best article is needed in cutting out garments. Ten years ago English sois brought double an apparently similar article of American make. Now the most costly shears in these days are of American manufacture, and every year a greater quantity of them is being imported. It is the boast of an American house that they ship shears regularly to Sheffield, and by so doing discount the oft-repeated story and fable about "shipping coals to Newcastle."—*London Machinery.*

ELECTRICITY IN PRESSING METALS.—Some experiments have been made in heating metal to a plastic state by electricity and then pressing it into shape with dies. Good results are obtained, but we doubt if the heating will not cost a great deal more than by direct fire. Gen. B. C. and R. A. Tilghman, of Philadelphia, made some time ago experiments to determine whether surplus metal could not be removed by rendering it plastic with a current passed through an abrading wheel, operating like an emery-wheel. The results, so far as we know, have not passed beyond Messrs. Tilghman's laboratory.

CASE HARDENING.—Prof. Elhn Thompson has recently devised a method of case-hardening iron or steel by means of the heat produced by the passage of an electric current. The process consists essentially in heating the object electrically and then applying to it a surrounding envelop—either gaseous, fluid or solid—for the purpose of changing or preserving the quality of the metal in accordance with the desired use of the material.

A PRACTICAL WAY.—A Worcester (Mass.) mechanic gives the following method of hardening any tool, which he has employed for some years: Forge the tool into shape, then melt in a dish sufficient babbit metal to cover the end of the tool as far as it is wished to harden it. Thrust the tool into the metal and let it cool. This will render any tool much harder than when cooled in oil or tempered by any other process.

QUALITY, efficiency and adaptability are vital considerations in selecting machinery.

SCIENTIFIC PROGRESS.

The Seisephone.

An Instrument to Detect Internal Flaws in Metal.

We have already in a previous issue made brief allusion to this invention and to its usefulness. We now give a fuller description of the instrument, its mode of use and several crucial tests which have recently been made to prove its reliability. We quote from *London Iron* as follows:

The importance, both in mechanical and civil engineering construction, of having metal free from internal flaws has always been recognized, and so has the difficulty of detecting them. We appear, however, to be approaching a solution of this difficulty by means of the seiseophone, which is the invention of Capt. de Place of Paris. This apparatus consists of a small pneumatic tapper worked by the hand, and with which the piece of steel or iron to be tested is tapped all over. Connected with the tapper is a telephone with a microphone interposed in the circuit. Two operators are required, one to apply the tapper and the other to listen through the telephone to the sounds produced. These operators, who are in electrical communication, are in separate apartments, so that the direct sounds of the taps may not disturb the listener, whose province it is to detect flaws. In applying the system, one operator places the telephone to his ear, and so long as the sounds produced by the taps are normal, he does nothing. Directly a false sound—which is very distinct from the normal sound—is heard, he instantly signals for the spot to be marked. By this means he is able not only to detect a flaw but to localize it.

Under the auspices of the Southeastern Railway Company, a demonstration of the seiseophone was given on Wednesday by Capt. de Place at the Charing Cross Hotel, in the presence of several members of the Ordnance Committee and other government officials. Mr. Stirling, the company's locomotive superintendent, had previously had several samples of steel, wrought iron, and cast iron prepared with hidden flaws known only to himself. The first sample tested was a portion of a railway carriage axle, which Capt. de Place pronounced to be had metal throughout, and which Mr. Stirling said he knew it to be. Other samples, consisting of bars of wrought and cast iron, one inch square, were tested, and the flaws localized by means of the apparatus. On breaking some of the bars, the internal flaws—the localities of which were known to Mr. Stirling by his private mark—were found to have been correctly localized by Capt. de Place. We must, however, record the fact that other bars were broken at points where the apparatus indicated a flaw, but where the metal was found to be perfectly sound. Some allowance should, perhaps, be made for Capt. de Place being subject to the disturbing influence of visitors. However this may be, the system does not as yet appear to be practically reliable, although we do not despair of its ingenious inventor being able to make it so.

THE SCIENCE OF METEOROLOGY is by no means an exact science as yet, but there is a steady gain toward exactness. Many problems which seemed insoluble a few years ago have been satisfactorily answered, and many more are being solved with favorable prospects of being determined before very long. As observation stations are multiplied and more data for calculations furnished, the chances of securing better results will be increased, and the predictions will be of more and more value. We are taught, says a contemporary, that the wind bloweth where it listeth, and whence it comes or whither it goes no man knoweth; but the weather bureau has undertaken to find out not only whence the wind comes but why it comes and when it may be looked for. To accomplish this must require the patient labor and incessant observation and study of years, and we should rather be grateful for what has been accomplished than displeased because perfection has not been attained. If any one will keep tally on the weather predictions for two or three months, he will be surprised to find that the bureau is right a great many more times than wrong, and that there is certainly something of value in the system which it has adopted and is trying to make more nearly perfect.

INTERIOR TEMPERATURE OF THE EARTH.—It is common to assume that the temperature of the earth toward the center increases one degree for every 60 feet in depth. This, however, is far from being universally the case. It does not hold good in California, nor in the Sierra Nevada mountains. At Virginia, Nevada, in the Comstock mines, the temperature in some cases increased one degree for each 20 feet up to 1000 feet in depth, or for 2500 feet, one degree for each 30.5 feet—twice as fast as the rule first named. At Manchester, England, in a shaft 2500 feet deep, the temperature is only 75°. In a copper mine at Cornwall, 2100 feet deep, the temperature is 88°. Subtracting 42° for the surface temperature, this makes in the first case a change of one degree in 65 feet, and in the second, one degree in 45.6 feet, from which it may be inferred there is no uniformity in the matter, consequently no rule.

REMOVING ODOR OF SULPHIDE OF CARBON.—Sulphide of carbon is an important substance

for many industrial purposes, but its disagreeable odor is very much in the way of its extensive employment. Quite lately a method has been devised for removing the odor which is said to accomplish its object. To effect this, it is first to be shaken up with one per cent of corrosive sublimate, this operation being repeated several times, after longer or shorter intervals. In this way certain sulphurets are produced, which cause the salt of the mercury to turn black. The liquid is then to be distilled, and that which passes over will have a much less disagreeable smell. If one-third of its bulk of the oil of almonds be added, the result is very satisfactory. The sulphide, under these circumstances, emits a pleasant odor, somewhat like that of ether.

Drugs and Fruit in Common Coal.

Very few people have any idea of the almost numberless products of common coal, and least of all that essence of fruits, drugs, and even wines are found in the ordinary, every-day fuel of the time. Yet such is the fact; coal has many uses beyond the mere giving of heat and light. These last have only been discovered of late years, although pitcoal has been known hundreds of years. Even illuminating gas was unknown a century ago, petroleum has been in use scarcely 40 years, and it is hardly more than 50 since some one discovered that stone coal was inflammable. Nearly all other products derived from soft coal have been discovered and applied in the interest of science or of fraud within the last 25 years. Some of them seem almost magical.

Besides heat and light, there are obtained from ordinary coal the means of producing over 400 shades of colors, among the chief of which are saffron, violet-blue and indigo. There are also obtained a great variety of perfumes—cinamon, bitter almonds, queen of the meadows, clover, wintergreen, anise, camphor, thymol (a new French odor), vaniline and heliotropine.

Among the explosive agents whose discovery has been caused by the war spirit of the last few years in Europe are two, called dinitrobenzene or hellite and pitrates.

To medicine, coal has given hypnone, salicylic acid, naphthol, phenol antipyrine—the last a remedy for "La Grippe." Benzene and naphthalene are powerful insecticides.

There have been found in it ammoniacal salts useful as fertilizers, tannin, saccharin (a substitute for sugar), the flavor of currant, raspberry and pepper, pyrogallol acid and hydroquinone, used in photography, and various substances familiar or unfamiliar, such as tarsine, asphaltum, lubricating oils, varnish, and the bitter taste of beer. By means of some of these we can have wine without the juice of the grapes, beer without malt, preserves without either fruit or sugar, perfumes without flowers, and coloring matter without the vegetable or animal substances from which they have hitherto been chiefly derived. So it will be seen that coal is an exceedingly versatile commodity.—*Ex.*

CHANGES IN THE TERRESTRIAL AXIS.—At the autumn meeting of the International Conference on Degree Measurement lately held at Freiburg, it was reported that a series of simultaneous observations carried on at Berlin, Strasbourg and Prague, showed that a decrease in latitude was in progress, at least in middle Europe, and a similar phenomenon had been noted in other places in Europe. This implied an alteration in the direction of the earth's axis; that is, the poles and equator, latitude and longitude, are not, as usually assumed, practically fixed data. The amount of ascertained decrease of latitude at the end of the six months' period from August, 1889, to February, 1890, was half a second. It was stated at the conference that the Berlin observations for the half year ending last August showed an increase of latitude amounting to 0.4, or two-fifths of a second. The fluctuation of the axis is thus due to a minute oscillation, probably owing to some changes in the internal mass of our planet, and not to be confounded with the precession of the equinoxes.

CONTROLLING SEX IN BUTTERFLIES.—A suggestive article as to the possibility of controlling sexes in butterflies has been communicated to the *American Naturalist* by Mrs. Mary Treat, and from the results of numerous experiments she finds occasion to believe that the larva to which the freshest and most tempting food was supplied in unlimited quantity nearly always developed into female butterflies, while those for which the supply of food was limited, almost as uniformly proved to be males. Dr. Packard is, however, inclined to think that the sex of this insect, as well as that of all animals from eggs, is determined at or about the time of conception, or, at least, early in the embryonic condition. In the honey-bee, especially, it has been proved that the sex is decided at the time the egg leaves the oviduct. The sex in man, according to Koelliker, becomes fixed toward the end of the second month of fetal life.

PLATE GLASS.—There are at least six plate-glass manufacturing companies in the United States which have an annual product of nearly 12,000,000 feet. This exceeds the entire production of Europe fifteen years ago.

DANISH EXPERIMENTS with armor plates have confirmed the result arrived at by the United States experts at Annapolis,

GOOD HEALTH.

The San Francisco Cancer Cure.

The fearfully rapid increase of cancer in all parts of the world, and on the Pacific Coast in particular, seems just at this time, in connection with the world-famous German cure for consumption, to be calling more than usual attention to the allged cure for cancer which has been kept hitherto from the people of this city and State for some three or four years past.

Go and See for Yourselves.

The specialist in question works with open doors, and may be found every week-day at 224 Post street, where any physician or other individual personally interested is invited to call between the hours of 10 and 12 A. M. During this time they can witness the mode and manner of treatment, examine and converse with patients, and have at the same time free access to all the remedies. These latter are perfectly harmless in character, and none of them contain any caustic, poison or mineral. The regular faculty, as a general rule, makes use of minerals more or less poisonous in character in their efforts to treat cancer otherwise than with the knife. It is

A Sad Commentary on the Healing Art.

And on the humanity of our physicians, that so few of that profession will take any pains to inform themselves in regard to this matter which is of such great importance to the health and lives of our people.

The piteous and despairing wails that daily go up from hundreds of suffering cancer beds in this city alone are calling loudly on the people of San Francisco to take some energetic step to secure a thorough and searching investigation into the truth or falsity of this alleged remedy. We hold that the array of evidence, positive in its character, is more than sufficient for the purpose of a positive instruction to our city or State Board of Health to inquire into the matter and report whether it is true or false. If true, the fact should be made known officially; if false, that fact should be made known so that the growing excitement in San Francisco should be allayed at once.

Several physicians and many citizens not heretofore interested in this inquiry are now looking into the matter with much interest. There are upward of 20 patients now under treatment, nearly all of whom have come from physicians of repute who have pronounced their cases cancer. All are apparently doing well. Of the entire number, not more than two or three are considered in any danger. Two or three of those doing well have been pronounced typical cases of scirrhus by several of our city physicians and others, several of whom are watching these particular cases with special interest.

Why do our leading doctors devote so much time to experimenting with the secret consumption cure which comes from Berlin, the curative virtue of which has not been thus far proven in a single case, while scores of cases of positive cure of a far worse malady than consumption can be shown in our own city of San Francisco, which are altogether ignored by these very same physicians. Is it because the former comes from a *protege* of royalty—from an imperial palace, while the other has been born of a humble searcher for truth in a plebeian San Francisco dwelling?

Both are secret remedies. The one has already secured a princely fortune in gold, even before a single cure is known to have been effected, in addition to which imperial honors have been showered upon him without stint. If time shall prove that his discovery is what it is represented to be, he has not been overpaid for what he has done for humanity.

Our own specialist is simply waiting for the same medical investigation which has been accorded to the Berlin specialist. Something in the way of compensation will of course be expected before the remedies will be given to the world. That compensation will be secured as soon as medical evidence is obtained that the remedies are what they are claimed to be; until then, nothing is expected.

Prof. Tyndall in a recent letter on the subject of cancer-curing, writes: "I would give a great deal to know something fundamentally true regarding the various phases of the terrible malady to which you refer. Some, indeed, among those near and dear to myself have been subjected to the surgeon's knife with a view to its extirpation. . . . This I do know of a certainty, that there are scores of scientific men, of the profoundest knowledge and the soundest judgment, who would willingly risk their lives in the attempt to extirpate cancer. The scientific journals of the world are open to him. These are the tribunals to which his claims ought to be referred." This is precisely what has been done in San Francisco. Failing to interest the medical profession when we first began to inquire into Dr. Cook's treatment, we were forced to place the matter before the public in a series of articles in the MINING AND SCIENTIFIC PRESS. These articles and cases have been produced in pamphlet form and have been widely circulated, with the result of drawing a large amount of attention to the subject, both that of professional and non-professional readers, of those who have been afflicted with the direful malady, or of those whose friends have been given over to a lingering and torturing death.

Our challenge to the medical profession has

been so far disregarded, and our appeal for a skilled and scientific investigation has been denied. We hope for better results in the future. In the meantime we assert that it has now become essentially the people's question, and to them we now appeal. Surgeons are powerless, and can do nothing but out away the growth, to have it return with tenfold virulence, and then resort to morphia to deaden pain. This is the Alpha and Omega of the profession in its treatment of cancer.

SHOP NOTES.

A SENSIBLE HINT FROM A PRACTICAL SOURCE. The value to the mechanic of good periodicals and papers pertaining to the business in which he is engaged, is often underrated by him, and he is apt to consider that he is none the worse for a lack of knowledge about the experience, opinions and work of others. This, says the *Master Mechanic*, is a most serious mistake on his part, and one which in the end will be suicidal to his best interests. One great reason why so much progress has been made in recent years lies in the fact that the ease with which men can give the results of their labors and experience to their contemporaries, or leave them to posterity, has resulted in a much greater diffusion of knowledge. In the mechanical field this circulation of knowledge has enlarged and is still enlarging the circle of men who are well posted and fully alive to all that is going on. How then can a man neglect those very means of advancement by which others are progressing? It matters not whether he be a fireman, engineer, machinist, foreman, master mechanic, or superintendent of motive-power, or whether his natural abilities be great or small, if he wishes to advance with the rest of the world, he must know what it is doing, and this knowledge must be derived from the pages of papers devoted to mechanical affairs. There are many young men who would be glad to get such reading, but who may not be able to pay for it, and there are others without any desire for it who would wake up to a realization of the possibilities in life before them if their views were enlarged. For these reasons a man is to be highly commended for putting into the hands of those in his employ good engineering and mechanical journals, but he is not true to his own interests if he himself neglects to read them.

THE ANNEALING OF TOOLS.—Some tools, such as circular cutters, files, etc., after they are forged into the shape required, must have teeth cut into them. Before this can be successfully accomplished, a preliminary process is necessary. Hammering or forging the steel into the shape required will have hardened the steel to such an extent as to make the cutting of teeth into it impossible or difficult. It must, consequently, be annealed. This process is a double one. The steel must be reheated as carefully as before, and afterward cooled as slowly as possible. Many tools are only required to be hardened on a small part of their surface, and it is important that the unhardened parts should possess the maximum amount of toughness with the minimum amount of brittleness that can be attained. These tools can also be annealed after they are forged. The process of annealing, or slow cooling, leaves the steel cross-grained, gives it its maximum of ductility, and causes it, in fact, to approach the properties of lead.—*The Ironmonger (London).*

SHOP DUST.—Operators in wood-working establishments are necessarily subjected to the unpleasant and unwholesome effects of dust, and in planing-mills and similar establishments it seems to be impossible to escape this nuisance. Modern shops are supplied with machines for carrying away much of the dust and shavings made by wood-working machinery, but even in the best-equipped shops the workers are obliged to inhale more dust than is wholesome. Planing-mill, sawmill and furniture factory operatives, and in fact all men who work in wood, have a peculiar appearance that is the result of inhaling wood dust. An observer would never mistake an old planing mill operator for a worker in a machine shop. Each bears in his face and general appearance the marks of his occupation.

THE FOREMAN of a shop can only form an opinion of what any one can do by the work he has done; if he is careless the work will show it, and show him up to his disadvantage. The workman who thinks he is the one who can be depended upon, but the non-thinker is "cheap help," and as such must take the chances. The workman who thinks of what he is doing, and of how to do it to the best advantage, is not the one who is always "getting no show," nor is he always complaining of hard times. The boy or man who does all he can, as well as he can, will very soon get better work, for it is to the foreman's interest to have each workman work on the best job he is capable of doing.

THE LARGEST CASTING EVER MADE.—A telegram from the East, dated Bethlehem, Pa., Jan. 31st, says: Engineer-in-Chief Melville and Lieutenants McElwain and Perry, United States Navy, witnessed the pouring of 75,000 pounds of casting for the manufacture of Government armor and plates at the Bethlehem Iron Company's ordnance works this afternoon. The casting is the largest ever made.

USEFUL INFORMATION.

An Artificial Earthquake.

The citizens of San Francisco, as if the natural throes of Mother Earth were not of sufficiently frequent occurrence to satisfy their taste for such pastimes, were treated to quite a large artificial shaka by the explosion of a large quantity of giant powder in the bowels of one of the Potrero hills. The sensation is described as quite satisfactory; but the following communication to the last issue of our contemporary *Industry* of this city, shows that we have been quite outdone by the recent explosion of 80 quarts of nitro-glycerine in the bottom of an oil well near Cleveland, Ohio, 1218 feet below the surface.

The correspondent says that a result of the explosion has been the formation of a chamber at the bottom of the well about "as large as a kitchen," whatever that may be.

After the well was charged with the explosive, what is then called a "go-devil," a piece of iron the diameter of the well, and 18 inches in length, was carefully let down upon the glycerine, which was then exploded.

The correspondent describes the explosion as follows: It was distinctly heard and felt, and resembled what one would judge to be an immense explosion about four miles away. Considerable time elapsed after the explosion, enough for us to think that there would be no visible signs on the surface, and for some of the parties present to begin to get nearer the well on account of the lapses of time; but finally an immense volume of black foaming water and oil came from the mouth of the casing, gradually increasing in height and breadth until it reached about twenty feet, when it began to spread, and the center of the black column, as it were, began to rise higher and higher until it attained a height of at least 100 feet to 120 feet, emitting water, crude oil, lime rock, parts of the casisters which contained the glycerine, the "go-devil" in innumerable small pieces, the largest of which was not more than two inches and polished like a piece of silver. The effect of this shower of missiles was something very interesting and quite pretty, mingled with the different colors of oil and water. The firing of the well was a grand success, as we have a volume of gas ranging in pressure from ten to fifty pounds, according to the amount used for lighting the house, cooking, heating furnace, and so forth. The oil pumped from the well is quite strong and highly volatile. It emits considerable gas, giving every assurance of a continued supply.

FERRID, A NEW ARTIFICIAL STONE.—Mr. Herman Pools describes in the *Journal of the Association of Engineering Societies* a new artificial stone, which is a compound, partly chemical and partly mechanical, of iron, sulphur and silicon, with more or less foreign matter. It is mainly a supersaturated solution of iron in the sulphur with the silica acting as a binder and hardener. In normal color is a dark slate varying somewhat with the manner in which it is dressed, but the color can be somewhat modified by the introduction of pigments. Successful imitations of various colored brick and sandstones have been made. It is about the hardness of ordinary bluestone and can be worked by the usual stone-cutting tools, turned in a lathe or planed. The tensile strength is from 650 to 1200 pounds per square inch and under compression it endures from 9000 to 12,000 pounds. Its specific gravity is about 2.6. It melts at about 300° Fahr. very slowly. It does not deteriorate under exposure to the weather. As it can be melted and molded, it is applicable to a great variety of uses to which stone cannot be put, and particularly so for large castings, such as pipes for sewage, etc. Architectural forms can be very conveniently made from it in position if needed. For culverts and bridge foundations, the perfect smoothness, of which the surface is susceptible, is advantageous in lessening water friction.

STRIKES.—Those who believe strikes are of modern origin are likely to be disabused by a recent article in the *Pail Mail Gazette*. According to accounts, strikes were extensively indulged in in Egypt 3000 years ago. It appears that workmen in those times were paid at the beginning of the month, and their "blue Monday" lasted well into the month. Then they had a habit of striking to obtain the means of living. In the building of temples, King Pharaoh himself was sometimes appealed to, the workmen refusing to return to work until he had given his decision. These men appear to have been quite as obstinate as men of modern times, and generally made a "compromise," much as is done in these days. They appear to have had the habit of throwing down their tools on slight provocation, and assembling together to talk over their grievances. Sometimes efforts were made to prevent them leaving the buildings upon which they were at work, but these efforts do not appear to have been successful.

SMOKELESS POWDER.—At the conclusion of the recent military maneuvers at Bordeaux, France, Gen. Ferron, commander of the Eighteenth Army Corps, issued an order of the day in which he says that the use of the smokeless powder will make no change in defensive tactics, but will render offensive tactics more difficult. It is also proposed to use smoke balls to counteract the action of the smokeless powder.

ELECTRICITY.

Need of Electrical Education.

Since we have elected that electricity is to be our servant and shall be made to give us light and power, we ought to make some effort to gain an understanding of its nature. The prospective purchaser of an electric-lighting plant often asks the question, "Will I have to hire a man specially to take charge of my lighting machine?" Generally the answer will be, "Oh, no; your engineer can easily look after the dynamo in connection with his engine;" and so the engineer is liable to be called upon almost without notice to operate an electric-lighting machine, and while in most cases he will have no trouble, and will probably get along in some way (applying as best he can the rather meager information given him by the electrical expert who erects the plant), still the man who has some knowledge of the apparatus will get much better work out of it and give far better satisfaction both to his employer and himself. Further than this, he is likely to avoid many difficulties and dangers with the electrical plant, which another, not so well posted, will be very apt to fall into.

A mechanic has a piece of work to do in some factory where there is an electric-lighting or motor plant. He knows nothing about the subject of electricity, and should his work be around the conducting wires or any part of the apparatus itself, he fears to handle them, or if he be brave enough to go to the work, does it very gingerly, not knowing whether he is damaging anything or not, and running the risk of injury to himself at any moment. In most cases he will send for an electrician, but will often find to his chagrin that there was no danger, and that the work might have been done without harm either to the electrical plant or himself.

This being the situation, we think all will agree with the suggestion that every first-class mechanic and engineer should have some knowledge of electrical matters. He need not necessarily be an electrical engineer, but should have a sufficient understanding of the subject to save him from danger and utter helplessness should he ever be called upon to do work in connection with an electrical installation. Appreciating the importance of the subject, we shall endeavor from time to time to give, in this column, some simple items which we trust will be of interest and value to our readers.—*Western Machinist.*

ELECTRICAL FURNACES.—It seems not unlikely that electricity will be applied to smelting furnaces in the near future. An electrical furnace has been patented in England which is said to have given excellent results in the series of tests to which it has been subjected. The electrodes are blocks of carbon secured in metal cases, and placed opposite to each other in the walls of the furnace. The metal cases containing the carbons are kept cool by circulating water around them, and the carbons themselves are capable of automatic adjustment to compensate for wear. Provision is made in the furnace for the escape of gas and for the introduction of the charge, and the electromotive force of the current can be varied according to the varying resistance of the charge.

SPLICING ELECTRIC LIGHT CARBONS.—The electric-lighting company of Concord, N. H., is using a device by means of which, it is stated, a saving of 30 per cent is effected in the cost of arc-lamp carbons. The trimmers bring to the station all the short pieces of carbon collected on their daily rounds. These are sorted and matched together, to form a carbon about eight inches in length. These pieces are placed in a machine which forms a dowel on one piece and a socket in the other, and they are cemented at the joints. The cement with which they are joined is heat proof and is a good conductor, so that there is no change in light indicated when the joint is reached. The spliced carbons are used only in the lower holder. Carbons thus joined have been used by the company for over a year, and the process is considered entirely successful.

ELECTRICITY for operating surface railways has come to stay, if it can only be used properly, and this remains with the electric companies to settle. If there is no other way to compass the end sought than the use of the poles and overhead wire—a constant menace to life—then we ought to wait patiently till something better is devised. Such an arrangement is a mechanical monstrosity and seems to be born of the desire to do things cheaply.—*American Machinist.*

ELECTRICITY VS. GAS.—The Paris gas company is said to be the first of the important European works of the kind to really show a visible decline directly due to the increase in electric lighting. The decrease for August and September, as compared with the same months of 1889, is eight and six per cent respectively.

AMERICA is not only furnishing Europe with all its electric machines, and lighting Paris by electricity, but has recently sold \$300,000 worth of dynamos and lamps with which to light up the London station of the Midland railway of England.

It is estimated that electric lighting in Paris in 1891 and 1892 will require a motive-power equal to at least 32,000-horse power.



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SAN FRANCISCO:

Saturday, February 14, 1891.

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Passing Events.

Affairs in the Legislature relating to electric roads have changed in the past week. Influenced by public opinion, the members have experienced a change of feeling and the bills have been so amended as to permit overhead wires or any other system in any city in the State.

The ratification of the agreement between the mining companies on the Comstock and the Tunnel Company, by which royalties on ore are materially reduced, is a very important change for the better. It is stated that other expenses of the mines will also be reduced, and this, in connection with the resumption of deep mining, should bring this famous mining section to the front again and show some profit.

The hydraulic-mining interests are receiving more attention at the hands of the Legislature this year than for years past. Several measures favoring a resumption of work on these mines have been introduced. It is pretty certain that the Government will be asked to pass such laws as will permit the working of the auriferous ground in the hydraulic mines.

ALL the plants in the Connellsville coke region, Pa., have closed down and 16,000 coke workers and miners are out on strike.

The Mining Industry in California.

Mining has done a great deal for the State of California, but the State of California has done very little for mining. What little it has done for the industry has been begrudged. It established a State Geological Survey, ran it a few years, and stopped it before the results of the work were all published, or all the work was done. It established a State Mining Bureau, kept it along at a starvation rate some years, gave it one decent appropriation, and now talks of stopping it on account of the expense. Meantime there are several Bureaus devoted to the advancement of agriculture, viticulture, horticulture, appropriations for district agricultural fairs, etc., while the one institution devoted to the mining interests is threatened with extermination by misguided legislation seized with an economical fit.

The mining community of this State has no general or local organization, no unions, no fairs or traveling shows. It has never banded together for political preferment, and has never received political consideration. Its members work along at their prospects and mines, attending to their own business, paying their own way, and asking no aid from the State to call attention to its products. Its interests have been summarily taken in hand by the Legislatures, Federal and State courts, to the great loss of individuals and the general detriment of the industry.

The sole and single thing done by the State for the advantage of the mining industry has been the establishment and maintenance of the Mining Bureau and its museum, and it makes any one interested in California mines impatient, to say the least, when a project is sprung to abolish it, especially that it has now reached a position where it can be of great advantage and use.

If it could be shown that the State Mineralogist was incompetent or using his position for his own enrichment, or that the assistants were unfitted for their work, or that money was being squandered, or that the report was a useless compilation, the maps wrong, the mineral collections being lessened, there was no demand for the report, and that the whole Bureau was a useless piece of political machinery, then it might be proper to consider its abolition. But none of these things are asserted or charged; it seems to be the idea to abolish it on general principle, as a measure of economy.

If the Bureau had never done anything else than produce its last report, this would be sufficient answer to its detractors. This report is not only in demand from all parts of this State, but from all parts of the United States. Other mining States are about to establish similar institutions to the one we talk of giving up.

"Never in any other country," says John S. Hittell in the February Century, "did a province repay new masters more liberally for their trouble in its acquisition, nor any other conquered territory ever receive greater benefit from conquest. The most notable instances in history of triumphant invasions rewarded with large sums of precious metal were those of Babylon by Cyrus; Persia, Alexander; Mexico, Cortez; and Peru, Pizarro—all populous empires with wealth accumulated through centuries of prosperity. Yet not one of them yielded to its conquerors, within a generation, so much treasure as did desolate California to the Americans."

And it is still yielding this treasure. It is not gold alone which our soil yields—and we produce more of that than any country in the United States—but silver, copper, lead, iron, quicksilver, borax, chrome, manganese, petroleum, asphalt, salt, platinum, mica, asbestos, ocher, mineral paint, pumicestone, slate, sandstone, granite, marble, rock soap, gypsum, soapstone, sulphur, lignite, bituminous rock, kaolin, natural gas, mineral waters, cement, lithographic stone, tin, tellurium, soda and a dozen other mineral substances, all of economic value and all worked.

It is absurd to say that a mining industry, based on such a variety of products, and so profitable withal, should not have a State institution devoted exclusively to its interests. A museum of the products should continue to be maintained and an annual report of progress should be made.

If the miners had a class organization, as mechanics and agriculturists have, a vigorous protest would have been entered at the first

whisper about the abolition of the Bureau. But as stated, there is no society or organization maintained by the mining community. This Legislature is the first one in years where the representatives from the mining districts have been able to force their interests to consideration, and it seems strange, therefore, that it should be the one to bring up the question of the abolition of the Bureau.

If the institution is not properly and satisfactorily conducted, let it be investigated by all means, and the fault, if there be any, remedied. But we have heard no charges to this effect, and the Legislature will do itself no credit in discussing the abolition of the California State Mining Bureau.

Tunnel Royalty.

In the MINING AND SCIENTIFIC PRESS of Dec. 13, 1890, it was announced that the Comstock mining companies had arrived at an understanding with the Comstock Tunnel Co. regarding the royalty on all ore mined, the agreement to be ratified this month. This ratification has just taken place. The prices of the new royalties we published at the date above referred to. The royalty is to be four per cent upon the gold value on battery assays, provided the royalty does not exceed \$2 per ton; or, in other words, on all ores running \$50 per ton down, four per cent is to be paid, and all over \$50, the royalty is \$2 per ton.

The previous rate of royalty had been \$1 per ton on ores grading below \$40 per ton. When the average of the ore fell to \$14 and \$16 per ton, this rate combined to make the working of such a class of ores unprofitable. On ores averaging \$14 per ton, the royalty will now be only 56 cents per ton instead of \$1, and on \$10 ores the rate will be 40 cents, etc.

The mining companies have been this week signing the new contracts with the Tunnel Co., and partial payments have been made on the back royalties.

This is a very important step in reducing the mining expenses on the lode. If the companies will now turn their attention to pruning down some of their expenses of office management, aside from the actual mining departments, it will be another good step. Mining matters should then be looked into carefully, and the companies would begin to make some money.

As it is now, according to the assessor's report, in the case of most of the companies, the expression, "cost of production above yield," is altogether too frequent. The Virginia Enterprise has proven by statistics that for every dollar invested in the Comstock \$7 has been taken out, and in view of the coming deep mining there are still great possibilities in this wonderful lode. It cannot be said, however, that the public has any degree of overconfidence in the way mining affairs are conducted. It is pretty certain that when the prospecting again commences in the old lower levels so long abandoned, public attention will be turned in that direction a great deal more than is the case at present. If the management take advantage of the opportunity to correct certain alleged abuses, it would be better for the companies, the lode and the public. Reductions in expenses are promised, but they should not stop at tunnel royalty but be continued wherever possible.

RIVER IMPROVEMENT.—The report of the board appointed to make an examination of the Sacramento river has been received by the War Department. The recommendations of the board may be summarized as follows: First—The permanent yearly appropriation of not to exceed \$25,000 for the improvement and conservation of the channels and banks by use of a snag-boat and crew on Sacramento river above Sacramento. Second—A specific appropriation of \$275,000 for the closure of Jacob slough and the east bank of the Sacramento above the city of Sacramento. Third—A specific appropriation of \$300,000 for the treatment of the Yuba river near and above Marysville. Fourth—A specific annual appropriation of \$20,000 for the improvement of the navigable channel of Feather river.

CHAS. BUTTERS of the Butters ore-milling works, Kennett, Shasta Co., has gone to Delagoa bay, Africa, to erect an extensive chlorination plant for an English mining Co. Mr. Butters has been very successful in handling rebellious gold ores.

Hydraulic Mining.

The mining men in the House at Sacramento succeeded in getting all reference to mining debris cut out of Clark's proposed congressional memorial, praylog for \$1,000,000 to promote the navigability of the Sacramento river. As finally passed by the House, the evils which brought about the shoaling are charged to "the neglect by the National Government of its rivers and other causes." The words "mining debris" do not appear in the document.

Following is a copy of a joint resolution which has been introduced on the subject of hydraulic mining:

WHEREAS, There is on the western slope of the Sierra Nevada mountains, in the State of California, an area of land comprising thousands of square miles, which embraces rich deposits of gold-bearing gravel, many of which deposits have been remuneratively operated; and, whereas, the gold in a large portion of said deposits can only be obtained at a profit under the system known as hydraulic mining, which system has been perpetually enjoined by the State and Federal courts because of the alleged injury to navigation and to alluvial lands tributary to the watershed of said mining region by the deposit of debris; and, whereas, the State and nation have urgent need of an increase in the circulating medium, which, through the suppression of hydraulic mining in the region referred to in the foregoing, has been decreased to the extent of \$8,000,000 in gold annually, the counties affected in the meantime losing 50,000 in population and millions in assessed valuation; and, whereas, his Excellency, the Governor, in his inaugural address, suggests that the subject be thoroughly agitated, Congress memorialized and our Senators and Representatives urged to take all necessary steps to bring the matter properly before Congress at the earliest possible moment; therefore, he it

Resolved, That our Senators and Representatives in Congress be and they are hereby requested to exert themselves to the utmost to secure the enactment by Congress of such laws as will enable the profitable working of the auriferous gravel deposits of this State, and in such a manner that the property of others will not be injured nor the navigability of rivers impaired.

Resolved, That our Senators and Representatives be and they are hereby requested to secure appropriations from the National Treasury for the construction of works under the direction or instruction of a National Commission to accomplish the desired end, and whereby the debris now in the mountain streams tributary to the valley rivers of the State will be reclaimed and prevented from becoming a source of destruction to said rivers and a source of loss to owners of lands bordering thereon.

PATENT DECISION.—An interesting patent suit was decided in the Circuit Court Tuesday. The parties to the case were Edward Morton et al. vs. the California Automatic Can Company. The suit was instituted some time ago by the complainants to recover damages for an infringement on a patent. Judge Sawyer has ordered that a decree for the complainants should be entered declaring the validity of the claimants' patents and holding that they had been infringed. To the master in chancery was referred the final decision of the case as to the amount of damages and the profits made by the infringements.

THE California Academy of Sciences has petitioned the Superior Court for permission to mortgage its property on Market street near Fourth street to the Lick Trustees for \$100,000. The money is needed to complete the building now in course of erection on the lot. There is money still due to the society from the Lick fund, but until the amount is clearly established, the Lick Trustees decline to advance any, unless it is in the shape of a loan. The new building cost a great deal more than was originally expected.

KLAMATH RIVER.—The bill to repeal the Act declaring the Klamath river a navigable stream was passed in the Legislature this week. There are two or three miles of navigable water at the mouth which the cannery people use occasionally, and for this reason the miners above have been prevented from hydraulicking to any extent.

CALIFORNIA POWDER WORKS.—At the annual meeting of the stockholders of the California Powder Works the following named were elected Trustees: John Birmingham (President), J. G. Kittle, M. A. de Laveaga, B. H. Balrd and B. Peyton. John F. Lohse was re-elected Secretary and Treasurer.

JOSEPH HOGAN, of Butte, has been appointed State Mining Inspector of Montana.

Prospecting in Alaska.

Considerable prospecting is now being done all along the Alaskan Coast down to the British Columbia boundary. The Indians often report knowing of gold mines, but do not work them themselves, nor do they point them out to white men. The mountain ranges of the interior have been very little explored; there are no roads, few trails, no settlements, and scarcely anything, comparatively, is known of most of the region. Up at Douglas Island, Juneau, along the Yukon and thereabout, mining and prospecting are being carried on. Some of the men remain there in winter and others come to this city during the cold season, returning in the spring.

The mining possibilities of the Territory are very great. Its extended area is such there are immense unexplored and unprospected tracts. Rich placer and quartz mines are known and worked and there must be plenty of others to be found. The lack of facility of travel from point to point is, however, a great drawback. Nearly all transportation is by water. There are water-courses in all directions, but as soon as one leaves them, there are dense and pathless forests, swamps, bogs, etc., to contend with. Great tracts are covered with beds of moss over which it is difficult to pass. The mountain regions are devoid of settlements or good trails, so that altogether prospecting there is rather more difficult than in most places.

Notwithstanding the obstacles, however, there are numbers of prospectors and miners at work in the Territory. The possibility of finding placer ground is a great attraction for old miners, who realize the advantage of that class of mining over quartz. The placers so far found are pretty rich, but their distances from centers of population and the short season for mining are detrimental. It is no country for poor men to go to, as expenses are high and there is little opportunity of working for wages. Men with any means, however, with a desire for mining adventure, will find a good field in Alaska.

El Dorado Slate.

The slate quarries of El Dorado county shipped last year 1,013,960 pounds, an increase of 100 per cent over the previous year. This record of the slate companies is a promising one and shows that they are steadily advancing. The quarries now have orders for 15 carloads on hand. There are two quarries in active operation, the Chill Bar and the California, one on each side of the American river.

We had a conversation this week with Edward Bird, Superintendent of the California Slate Co., who says they have more orders than they can at present fill. The vein is a good one, but is not properly opened, owing to lack of capital. The quarry is opened in benches, and three galleries are running now. The company has an incline road and its own water-power. Most of the product is used for roofing purposes.

About \$10,000 worth of slate was sold last year, but this season more money will be raised and a larger force of men will be put at work. Two years ago it was difficult to find sale for the slate, but now the demand exceeds what the quarry can produce without the investment of more capital. The quarry is three miles from Placerville, and 14 men are at work in it. The slate is good tough material superior to that for similar purposes brought from the Eastern States.

A LEACHING PLANT.—The president of the Holmes Mining Co. of Nevada, in his annual report stated that the experimental test of the leaching works recently erected had been such an assured success that the leaching plant would soon be increased to a capacity for treating 100 tons of ore per day, which would enable low-grade ores to be profitably worked, and would permit of dividends being paid.

MONTANA COPPER.—Of the 122,950,000 pounds of copper produced in Montana during 1890, the Anaconda company is credited with 64,046,812; Parrot, 9,000,000; Clark's Colusa and the Boston and Montana, 26,822,804; Butte Reduction Works, 3,300,000; Colorado Smelting and Mining Company, 21,071,122; Butte and Boston, 5,357,723, and all other sources of copper supply in the State, 3,351,539 pounds.

Pavant Butte.

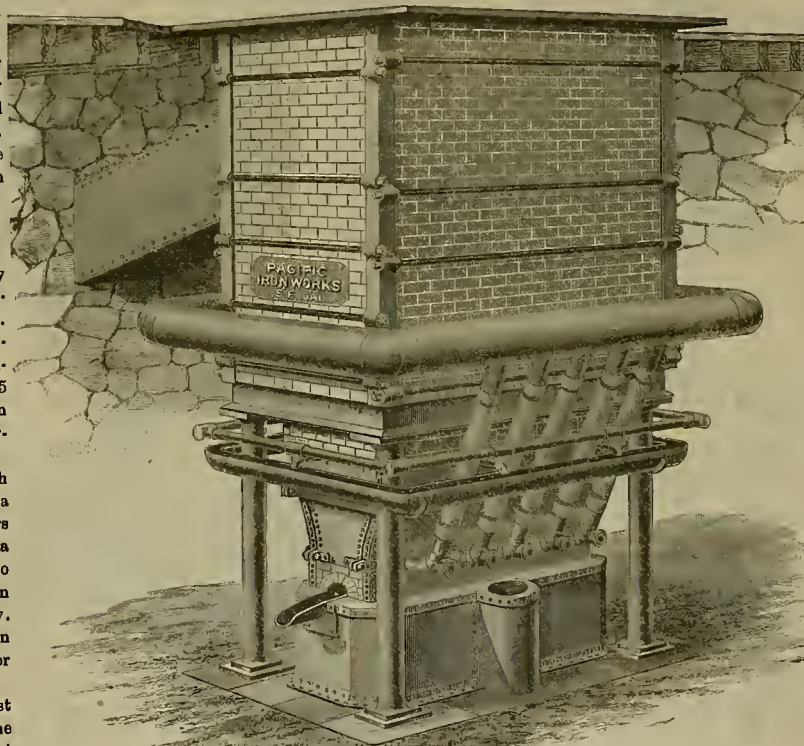
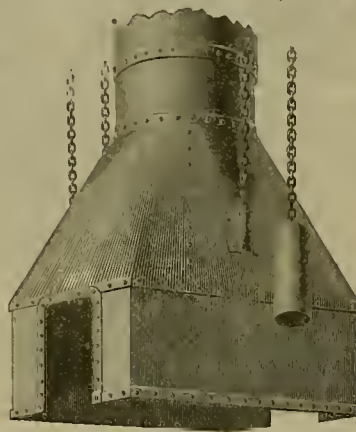
Pavant Butte, which stands 10 miles north from the Ice Springs lava-slide, and 17 miles by road from Fillmore, is an acute peak about 800 feet high. It is the tallest of all the volcanic hills in the Lake Bonneville region, and is a conspicuous landmark. In general form it is that of a cratered cone, but the crater is open at the south, and the circling crest has an acute culmination at the north. The engraving shows the general features of this curious volcanic cone.

Its material is a volcanic tuff; that is to say, it consists of light lapilli cemented into a coherent mass. Scattered through the mass are occasional boulders of basalt, which must have

Black Sand Mines.

Some of the black sand mining companies near Crescent City, Del Norte Co., are meeting with good prospects in their ocean beach mines. The sand for several miles up and down the coast from that place, yields both gold and platinum; very little if any capital has been put into this branch of mining, which if more properly developed would employ numbers of men.

The ocean beach sand mines near Lompoc on the southern coast are profitably worked by several companies. The beaches are worked during certain periods by small companies or by individuals. The same is the case at a few other points along the coast; but by far the most extensive deposits of auriferous black sand



PACIFIC WATER JACKET SMELTER

reached their position by ejection from the vent.

Geologists learn by constant and cumulative evidence that an eruption took place here while Lake Bonneville was at its highest stage, and beneath a body of water 350 feet deep. The resultant cone was built not only to the surface of the water, but 450 feet higher. Eruption ceased with the fall of the water and has not since been resumed.

The surface of the plain for a short distance in all directions from the cone is composed of debris from it. Beyond this southward outcrops the white marl, and beneath the white marl a field of lava.

APPRECIATIVE "G. H. B." of Tuscarora, Nevada, writes: "I very much appreciate your valuable paper, the MINING AND SCIENTIFIC PRESS. I consider that if I did not read more than the 'Health' column I would be fully rewarded for the subscription price."

THE January pay-rolls of the Comstock mines aggregated \$180,848.

are in Del Norte and Humboldt counties, on the ocean beaches. At Gold Bluff the deposits extend back several miles. In the early days the deposits paid handsomely. There are difficulties, however, in working the deposits back from the beach. Capital is needed to outfit the claims, and there is very little capital invested in mines in that region. The largest known deposit has not been worked in some years. There is room for improvement in the methods of working the black sands of the ocean beaches, as under present conditions there is considerable loss of gold.

THREE miners were rescued from the Susquehanna coal mine, Pa., after being imprisoned in the flooded mine for five days. They were aroused in a little hole on the top of a cross-heading, with the water nearly touching their feet.

THERE are seven ships carrying 9000 tons of niter from Chill on the way to this port. The local powder companies will not sell any except at a large advance.

A Smelting Plant.

(Continued from page 97.)

A boiler-iron foundation and curb is provided, inside of which the hulk crucible is made, which prevents any loss should the crucible crack or have a tendency to leak. The lead well, connecting by syphon-tap, is located outside of curb, and is also inclosed. Two slag-spouts are provided for the discharge of slag (one at each end of the furnace), which can be easily detached and replaced when burned out.

The superstructure of brickwork is supported by four heavy iron columns, carrying a deck plate made of wrought-iron channel beams well secured with bolts and wrought-iron plates. The brickwork is securely bonded by wrought-iron bolts and heavy cast-iron corner plates, thus preventing a tendency to crack. The top of the brickwork is capped by a heavy cast-iron plate, to which is fastened the feed-hopper. The dust and fumes pass into the main condensing-chamber through the square pipe at the rear of furnace, as shown in cut.

A galvanized wind or "hustle" pipe surrounds the furnace and receives the blast from the blower and distributes it through the tuyere pipes.

A telescope stack with hood is suspended from proper supports above the furnace, which can be raised or lowered as occasion requires, and is for the purpose of taking off obnoxious fumes should they find their way through the charge into the feed-hopper. The furnace is furnished complete with all pipes and fittings necessary to supply and discharge the water for cooling the jackets.

The Keystone Boiler Works.

The Keystone Boiler Works (Hamilton & Leach), on the corner of Folsom and Main streets, in this city, filled contracts last year for all parts of the coast. Among others, four lumber companies have been supplied with 15 boilers as follows: Nine, each 54 inches in diameter and 16 feet long, built of steel, with uptakes, steel tubes, grates and bars complete for the Bellingham Bay Company. The Sierra Lumber Co. was furnished with two steel boilers, each 48 inches in diameter and 16 feet long. The Towle Brothers' Lumber Co. has also received two boilers, each 42 inches in diameter and 13 feet long. Two boilers were supplied to a lumber company in Amador county, each boiler being 42 inches in diameter and 14 feet long, and two more to the Tulare Gas Co. In this city the stock of 15 boilers set up in the works of the California Electric Light Company, two boilers for the Baldwin Electric Light Works, and the five boilers in the Chronicle building, can be seen in daily use, and the different engineers in charge all recommend the work highly.

Among stationary boilers built during the year by the works in this city are: One 64 inches in diameter and 16 feet long in the Keyes building on Stockton and O'Farrell streets; one 54 inches diameter and 16 feet long for the Golden Gate distillery; one for the Electric Improvement Co., on the corner of Davis and Vallejo streets, 72 inches in diameter and 16 feet long, and one for the Union Club, 48 inches diameter and 14 feet long. They have recently finished a marine boiler for the whaler Belvidere, and others of a similar type were made last year. These works have been very successful, as the above record shows. Wrought iron tanks of all kinds, salmon-canery plant and every kind of stationary wrought-iron work is undertaken, and nothing leaves the works till it has been tested and shown to be all that the specifications require.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

JOSEPH WINTERBURN CO., Feb. 5. Object, to conduct a general printing and electrotyping business. Capital stock, \$35,000. Directors—Joseph Winterburn, Geo. F. Winterburn, Wm. Hoffschneider, Wm. Hoffschneider Jr. and Theodore Trautner.

ARCADIA HOTEL CO., Feb. 5. Object, to conduct a hotel in Santa Monica, Los Angeles Co. Capital stock, \$100,000. Directors—H. I. Kowalski, E. Lastreto, S. Ephraime, W. M. Fitzmaurice and C. Levy.

FAIRBANKS SUPPLY CO., Feb. 6. Object, to deal in warehouse and railway supplies. Capital stock, \$50,000. Directors—H. L. Hutchinson, L. H. Parker, Wm. Rennie and W. C. Allis.

EAGLESON-HAWKINS CO., Feb. 6. Object, to deal in furnishing goods. Capital stock, \$200,000. Directors—R. Eagleson, J. G. Eagleson, W. I. Hawkins, W. E. Hawkins, F. H. McConnell, J. McCulloch and E. B. Holden.

NEW YORK M. AND PROSPECTING CO., Feb. 9. Capital stock, \$100,000. Directors—E. H. Cooke, B. E. Stall, J. P. O'Brien, C. H. Wall and R. G. Falk.

ST. PAUL M. AND PROSPECTING CO., Feb. 9. Capital stock, \$100,000. Directors—E. H. Cooke, B. E. Stall, J. P. O'Brien, C. H. Wall and R. G. Falk.

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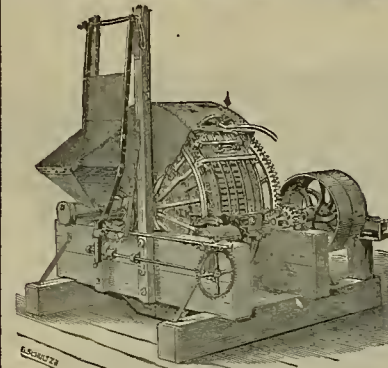
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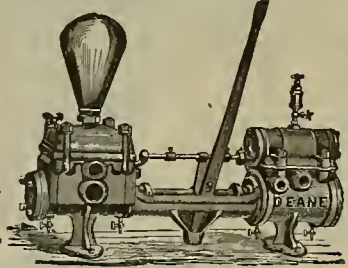
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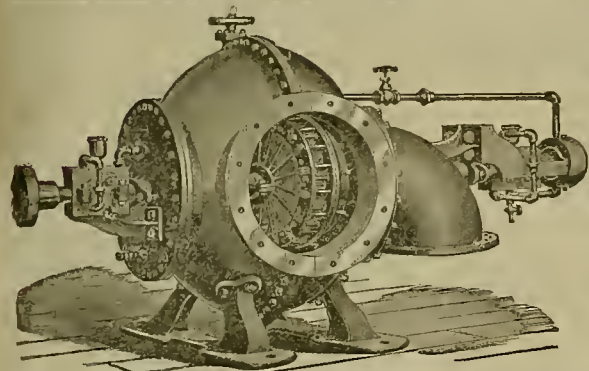
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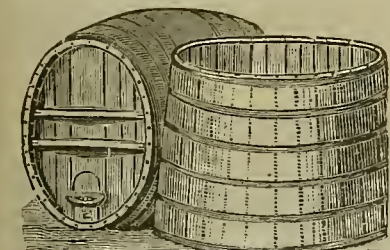
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Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case.
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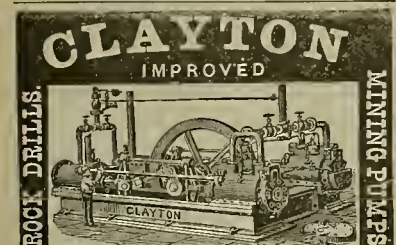
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, Feb. 12, 1891.
The weather continues the absorbing topic, and will be throughout the present month. With a generous, well-distributed rainfall, business in all lines will revive. The deposit of snow on the mountain ranges is very light, and unless large deposits are made in this month and March, the supply of water for mining purposes will be light in many localities; but then river mining can be done to much better advantage.

MEXICAN DOLLARS—The market is barely steady at 82 to 83 cts.

SILVER—Department purchases in this month are reported as follows:

Date.	Offered ounces.	Purchased ounces.	Price paid per ounce.
Feb. 4.....	1,132,000	478,000	\$1.0260 to \$1.0275
Feb. 6.....	1,057,000	507,000	1.0350 to 1.0225
Feb. 9.....	788,000	150,000	1.0605 to 1.0100
Feb. 11.....	823,000	414,000	1.0150 to 1.0190

Total purchase to date, 1,549,000.

Pending the action of Congress on the Free-Coinage bill, the markets at home and abroad are heavy. The monetarists at the East are leaving nothing undone to defeat silver legislation. While it cannot be denied that some of the gold bugs are honest in their views, yet it is equally self-evident that many of them are actuated by self-interest in their desire to defeat bimetalism. With silver a commodity, speculation in farm products, and also in all securities having silver for their basis of value, becomes more profitable to the moneyed few. On this coast, where the farming and mining industries are largely dependent upon the price of silver, there is no leading commercial paper to advocate bimetalism, which naturally creates the belief at the East that we are indifferent to the remonetizing of silver. It is hard to predict the legislation by this Congress, but it is quite certain that the next Congress will pass a free-coinage bill, and if it is vetoed it will be passed over the President's veto. There is little silver offered for sale in our market—that is, not much compared with former years. The output of the mines appears to be less.

QUICKSILVER—Receipts the past week aggregate 282 flasks, and exports by sea 10 flasks. The market is lower, due to the unfavorable effect of the McKinley tariff, and also to more selling competition. Outside mines sell at the best obtainable figures, even if a cent below asking prices for standard brands.

BORAX—Exports by sea the past week aggregate 811,523 lbs. of borates to New York. The market is reported steady, with an improving inquiry from the East.

COPPER—Exports by sea the past week aggregate as follows: To New York, 1600 lbs. copper cement, and 870,200 lbs. copper matte. Compared with the first two months in 1890, the output of the mines on this coast this year shows an increase. The home consumption is larger. The Eastern and European markets are reported by telegraph as having a steadier, firmer tone, with better prices looked for later on.

LEAD—The smelter at Tacoma, Washington, is turning out about 750 pigs every five days, which, being marketed in this city, has created lower prices. Cannery and other large consumers are confining their purchases in order to buy as cheap as possible.

TIN—The market shows more strength. Cannery are taking more. English advices report a barely steady market for Straits, but a continued free shipment of pig to America. The consumption on this coast promises to be large this year.

IRON—The market is barely steady for spot. With rain a better demand would set in. The supply here and to arrive is large. To sell, concessions are necessary.

LIME—Receipts the past week aggregate 3482 bbls., and exports by sea 100 bbls. to Kahului and 300 bbls. to Honolulu. The market is steady at current quotations.

COAL—Imports the past week aggregate as follows: Departure Bay, 4020 tons; Esquimalt, 1840; Tacoma, 6000; Newcastle, N. S. W., 10660; Coos Bay, 350; Seattle, 10,348; Nanaimo, 873; Comox, 4100. Total, 28,647 tons. The market shows continued weakness, with concessions obtainable, although no lower quotations are made public. Australian from ships' sides is obtainable—below \$9 a ton. With southerly winds, Australian vessels will soon come in, as will also the English vessels about due. These arrivals would break the market. Coast colliers' outputs continue large, and with more foreign to draw from, prices must give way. Dealers buy sparingly. A noteworthy event of 1890 was the quiet opening of a bituminous coal mine in this State near Carmelo Bay in Monterey county. The deposit is said to average about five feet wide. The grade is good, comparing favorably with Wellington. For steam purposes it is well adapted. It is the only bituminous coal mine, outside of British Columbia, on this coast.

Eastern Metal Markets.

By Telegraph.

New York, February 12.—The following are the closing prices the past week:

	Silver in London.	New York.	Copper.	Lead.	Tin.
Thursday.....	48 1/2	1 02 1/2	14 25	4 40	20 00
Friday.....	48 1/2	1 01 1/2	14 25	4 40	20 00
Saturday.....	48 1/2	1 00 1/2	14 25	4 35	20 10
Sunday.....	48 1/2	1 01 1/2	14 25	4 35	20 10
Tuesday.....	48 1/2	1 01 1/2	14 25	4 32 1/2	20 05
Wednesday.....	48 1/2	1 01 1/2	14 25	4 34 1/2	20 10

Copper is steady, with outside holders cleaning up. Tin is strong; Straits, \$20.10. Cannery may be interested to know the edge is off the tiplaine boom for the moment. Cash buyers may pick up a small line of spot stock here and there at a little concession from the prices asked for the future. Quicksilver is moderate at 67¢@68¢. Borax at last prices is firm. The recent supplies have been well absorbed.

The total hullion output of the Comstock lode during the year 1890, according to statements filed with the assessor of Storey county, Nev., aggregated \$3,915,212, as compared with a production of \$5,145,681 in 1889.

Mining Share Market.

Mining shares the past week were depressed by the manipulators, who withdrew active bidding in order to take in all the stocks they could at lower prices. Heretofore the market has acted as if the moves were made to sell stock, but the recent decline puts a different front on the situation, for as soon as outsiders began to be attracted by the strength of the market, bear reports were set afloat. No encouraging news was allowed to be put out by the inside bureau of special information, but on the contrary, discouraging news was circulated by the bureau. To still further depress stocks, the quarterly reports of the ore-producing mines were made public one month earlier than usual. This was doubtless done owing to the supposed sworn statements being unusually bad. It looks if those who buy stocks for cash and will not be frightened if a small decline should take place, will make money on the investment before thirty days pass by, provided they are content with a fair profit. This opinion is based on work of a very important character being done in several of the mines, which cannot be kept secret much longer.

In outside stocks the Tuscaroras showed a strong tone at a slight decline, as if insiders were buying. The Quijotas appear to be blackboarded. The Bodies made quite an upward move under the leadership of Bodie, which doubled up, but then fell back much easier. There are plenty of hull points out on the stock. Eureka holds very strong with the stock apparently scarce.

The market opened this (Thursday) morning fairly steady, with light trading. After the regular session the middle stocks, under Hale and Norcross leadership, scored a slight advance; the other stocks had a firm tone, particularly the Union and Sierra Nevada group. For the Alta group there has been and continues to be strong buying. The Bodies were higher after the board this morning.

Private but thoroughly reliable news from the Comstock mines is of a very important character, but inside news is still of a bearish character. Official letters received to-day from the Gold Hill mines are remarkable for the absence of any favorable news, which is entirely different from reliable private advices. The official letter from Savage reports active work under way, but fails to report about the ore found on the levels they are now working on. The official letter from Hale and Norcross reports being in ore on all the various levels, but this we outlined two weeks ago. Running west, they ought soon to report being in very rich ore, unless the mine managers suppress the news so as to keep control of the mine at the annual election in next month. If the brokers refuse to give proxies for stocks in their name, then those who buy in control will be forced to enter the market as buyers of the stock so as to retain possession of the mine. In Union and Sierra Nevada several levels are ready for active prospecting work. From Com. Virginia, Ophir and Gould and Curry, favorable news comes to hand. Everything points to more active and exciting times in the near future. From the outside mines our advices report very rich ore on the 350-foot level in Belle Isle. The ledge is about three feet wide. They have followed it for a distance of about 300 feet. They are still running to tap the downward continuation on the 450-foot level. From the other Tuscarora mines, the news is uniformly good. From the Bodies, our advices are confirmatory of those published last week. All indications point to close proximity to a rich find in Bodie. Bulwer is extracting ore for milling.

San Francisco Metal Market.

Wholesale.

THURSDAY, February 12, 1891.

ANTIMONY.....	2 1/2 @	19
BORAX—Refined, in carload lots.....	5 @	—
Powdered.....	8 @	—
Concentrated.....	7 1/2 @	—
All grades jobbing at an advance.		
COPPER.....	23 @	—
Bolt.....	23 @	—
Sheeting.....	23 @	—
Ingots, jobbing.....	23 @	—
do, wholesale.....	17 @	—
Fire Box Sheets.....	13 @	25
LEAD—Pig.....	— @	25
Bar.....	6 1/2 @	65
Sheet.....	7 1/2 @	—
Pipe.....	6 1/2 @	—
Sheet, discount 10% on 500 bags.....	1 50 @	—
Buck, 3 bags.....	2 00 @	—
Chilled, do.....	2 20 @	—
QUICKSILVER—By the flask.....	50 @	49 00
Flasks, old.....	10 @	55
CRUICKSON IRON ORE.....	10 @	—
STEEL—English, 1/2 ton.....	16 @	20
Canton tool.....	9 @	9
Black Diamond tool.....	9 @	9
Pick and Hammer.....	8 @	5
Machinery.....	4 @	5
Toe Calk.....	4 @	5
Tinplate—B. V., steel grade, 14x20, to arrive.....	6 50 @	—
B. V., steel grade, 14x20, spot.....	6 37 @	—
Charcoal, 14x20.....	30 @	—
do roofing, 14x20.....	13 @	—
do, do, 20x25.....	13 @	—
Pig tin, spot, 3 lb.....	— @	22
IRON—Bar, base.....	3 @	22
Norway, base.....	4 @	22
IRON—Glenageon ton.....	31 @	—
Eginton, ton.....	29 @	—
American Soft, No. 1, ton.....	— @	30
Oregon Pig, ton.....	— @	30
Puget Sound.....	30 @	—
Clay Lane White.....	26 @	—
Shots, No. 1.....	32 @	—
Langdon.....	30 @	—
Thornduff.....	30 @	—
Gartsherrie.....	30 @	—
Barrow.....	30 @	—
Cargoheel.....	30 @	—

Coal and Coke.

SPOT FROM YARD—PER TON	TO LOAD—PER TON
Wellington.....	\$12 00
Greta.....	—
Chapel Hill.....	—
Nanaimo.....	—
Gilman.....	—
Seattle.....	—
Coos Bay.....	—
Cannel.....	—
Egg, hard.....	—
Cumberland, in sacks 19 50	
do, bulk.....	—
Walsend.....	—

Coke—English.

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ASSESSMENTS.							
COMPANY.	LOCATION.	No.	AMT. LEVIED.	DELINQ.	SALE.	SECRETARY.	PLACE OF BUSINESS.
Adelaide Copper Co.....	Nevada.....	2.....	6, Dec 27.....	Jan 31.....	Feb 28.....	W H H Graves.....	426 Sansome St
Atlantic Con M Co.....	Nevada.....	7.....	25, Nov 19.....	Mar 2.....	Mar 21.....	D H Kent.....	330 Pine St
Brunswick Con M Co.....	California.....	1.....	2, Jan 9.....	Feb 10.....	Mar 7.....	G Stadfeldt.....	309 Montgomery St
Challenge Con M Co.....	Nevada.....	5.....	50, Jan 23.....	Feb 27.....	Mar 18.....	C L McCoy.....	331 Pine St
Contra Estaca Con Mex M Co.....	Mexico.....	1.....	50, Dec 15.....	Feb 14.....	Apr 4.....	George Gale.....	309 Montgomery St
Del Monte M Co.....	Nevada.....	4.....	10, Jan 5.....	Feb 9.....	Mar 3.....	J W Pew.....	310 Pine St
Gould & Curry M Co.....	Nevada.....	65.....	3, Feb 5.....	Mar 9.....	Mar 30.....	A W Burrows.....	309 Montgomery St
Guadalupe M Co.....	California.....	3.....	10, Jan 16.....	Feb 26.....	Mar 21.....	H F Schettler.....	303 California St
Hale & Norcross M Co.....	Nevada.....	97.....	50, Jan 7.....	Feb 11.....	Mar 4.....	A E Thompson.....	309 Montgomery St
Head Creek & Tranquility M Co.....	Ariz.....	2.....	5, Jan 19.....	Feb 26.....	Mar 25.....	J F Pew.....	310 Pine St
Lewell G M Co.....	California.....	1.....	10, Jan 23.....	Mar 2.....	Mar 21.....	E F Stone.....	309 Pine St
Lloyd Marble Co.....	California.....	11.....	10, Dec 16.....	Jan 30.....	Feb 20.....	G W Luce.....	331 California St
Kentuck M Co.....	Nevada.....	23.....	35, Dec 23.....	Feb 3.....	Feb 25.....	J W Pew.....	310 Pine St
Martin White M Co.....	Nevada.....	25.....	50, Feb 2.....	Mar 6.....	Mar 30.....	A B Cooper.....	325 Montgomery St
Middle Creek M Co.....	British Columbia.....	1.....	50, Jan 23.....	Mar 10.....	Apr 2.....	H D Hawks.....	318 Pine St
Midas M Co.....	California.....	1.....	20, Jan 13.....	Feb 23.....	Mar 25.....	A H sey.....	323 Montgomery St
North Gould & Curry G & N Co.....	Nevada.....	12.....	23, Jan 10.....	Feb 11.....	Feb 28.....	G H Mason.....	331 Montgomery St
Oak Con M Co.....	California.....	7.....	4, Dec 18.....	Feb 2.....	Mar 2.....	E F Ryan.....	230 Montgomery St
Quaker M Co.....	California.....	22.....	15, Dec 27.....	Feb 3.....	Feb 24.....	A Cheminant.....	328 Montgomery St
Sierra Nevada S M Co.....	Nevada.....	98.....	30, Jan 2.....	Feb 5.....	Feb 24.....	E L Parker.....	309 Montgomery St
Telegraph Drift M Co.....	California.....	2.....	17, of 1 mill, Jan 20.....	Mar 4.....	Mar 25.....	F R Webe.....	Downtown
True Con M Co.....	California.....	10.....	24, Dec 13.....	Jan 31.....	Jan 28.....	G O Bates.....	434 California St
Union Con S M Co.....	Nevada.....	42.....	25, Jan 5.....	Feb 10.....	Mar 2.....	A W Barrows.....	303 California St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING	DATE
Natoma M & W Co.....	California.....	D H Ward.....	503 California St.....	Annual.....	Feb 16
Watt Blue Gravel Co.....	California.....	G A Bertou.....	323 Montgomery St.....	Annual.....	Feb 20

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE
Candelaria Con M Co.....	New Mexico.....	G Gale.....	309 Montgomery St.....	25.....	Dec 3
Commonwealth M Co.....	Nevada.....	R R Grayson.....	331 Pine St.....	20.....	Nov 29
Ossington M Co.....	California.....	T Wetzel.....	323 Sansome St.....	15.....	Feb 16
Quaker M Co.....	California.....	A H Clough.....	230 Montgomery St.....	10.....	Feb 10
Jackson M Co.....	California.....	W R Drake.....	311 Pine St.....	10.....	Jan 19

Sales at San Francisco Stock Exchange.

THURSDAY, February 12, 9:30 A. M.

50 Alpha Con.....	80c	400 Fischequer.....	60¢@65¢
450 Andes.....	1.00 @ 1.05	500 Hale & Nor.....	1.95
300 Belcher.....	1.45	100 Justice.....	.95c
100 Belle Isle.....	.45c	400 Kentuck.....	.35c
140 Best & Belcher.....	2.40 @ 2.45	150 Mexican.....	2.35 @ 2.40
50 Bodie.....	1.20	200 Mono.....	.65c
100 Bulwer.....	.35c	400 N. Commonwealth.....	.50c
100 Challenge Con.....	.35	50 Ophir.....	.325
100 Chollar.....	1.35	100 Overman.....	1.80
500 Con Cal & Y.....	4.45	250 Savage.....	1.55
100 Con. New York.....	1.5	250 Sierra Nevada.....	2.10
450 Gould & Curry.....	2.15 @ 2.20	50 Yellow Jacket.....	2.30

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J. W. KNAPP—Amador Co.
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MRS. M. E. DUBRY—Ventura Co.
W. V. WADSWORTH—Sutter and Yuba Cos.
ANDREW REID—Monterey Co.
M. S. PRIME—Alameda Co.
E. H. SCHAEFFER—Calaveras and Tuolumne Cos.
F. B. LOOAN—Solano Co.
A. S. COOLEY—Tehama Co.
SAMUEL CLIFF—Creston, Cal.
JOHN SIMPSON—Oregon.
Wm. M. HILLBART—Oregon.
Wm. HOLDEN—Oregon.
ELMER JENKINS—Del Norte Co.
H. C. HENKLE—Capay Valley.

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A COMMON SENSE CALENDAR.

The calendars that come in the fall are as numerous as the flowers that bloom in the spring. Many further resemble the flowers in that they come without being sent for, and fade after a very brief existence. The most sensible and business-like Calendar that we have seen comes to us from M. W. Ayer & Son, Newspaper Advertising Agents, Philadelphia, and bears their "Keeplog everlasting at it" imprint. It is so large and clear that its dates can be easily distinguished across an office, and is printed in a manner to reconcile the most fastidious to its company for a year. It is sent to any address, postpaid, on receipt of 25 cents.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Jan. 22.	WEEK ENDING Jan. 29.	WEEK ENDING Feb. 5.	WEEK ENDING Feb. 12.
Alpha.....	.80	.95	.80	.85
Alta.....	.60	.70	.55	.60
Andes.....	.50	.85	.80	.85
Belcher.....	1.55	1.75	1.10	1.70
Best & Belcher.....	2.25	2.60	2.40	2.65
Bullion.....	2.10	2.45	1.95	2.25
Bodie Con.....	.75	.95	.85	.90
Bulwer.....	.25	.25	.25	.45
Commonwealth.....	.75	.80	.75	.80
Con. Va. & Cal.....	3.60	4.30	3.70	4.15
Challenge.....	1.60	1.90	1.45	1.70
Chollar.....	2.10	2.40	2.10	2.45
Confidence.....	5.12	5.09	5.25	5.12
Con. Imperia.....	.20	.25	.20	.25
Candelaria.....	.40	.45	.40	.45
Crowa Point.....	1.65	1.85	1.70	1.80
Crocker.....	.10	.20	.10	.15
Del Monte.....	.10	.15	.10	.15
Eagle & Con.....	3.10	3.75	3.15	3.00
Eschequer.....	.75	.85	.70	.75
Grand Prize.....	.20	.20	.20	.20
Gould & Curry.....	2.25	2.95	2.45	2.40
Hale & Norcross.....	1.35	1.80	1.40	1.55
Justice.....	.90	.95	.95	1.00
Kentuck.....	.80	.85	.75	.85
Lady Wash.....	.20	.20	.20	.20
Mono.....	.60	.60	.60	.60
Mexican.....	2.20	2.35	2.45	2.60
Nevada.....	.20	.20	.20	.20
North Belle Isle.....	.40	.50	.45	.50
Nev. Queen.....	.25	.30	.25	.30
Ossington.....	.20	.25	.20	.25
Ophir.....	3.10	3.45	3.15	3.40
Overman.....	1.75	1.80	1.70	1.80
Potosi.....	4.40	5.25	4.40	5.25
Pacific.....	.10	.15	.10	.15
Pear.....	2.05	2.65	2.10	2.65
Savage.....	1.70	1.85	1.80	1.85
S. B. & M.....	.85	.90	.80	.85
Sierra Nevada.....	1.70	1.85	1.80	1.85
Silver Hill.....	.20	.25	.20	.25
Scorpion.....	.20	.25	.20	.25
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Assessment Notices.

GRAY EAGLE MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Placer County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 4th day of February, 1891, an assessment, No. 22, of Three (3) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 353 California Street, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 9th day of March, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 30th day of March, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors. A. W. BARROWS, Secretary pro tem. Office, Room 11, No. 353 California Street, San Francisco, California.

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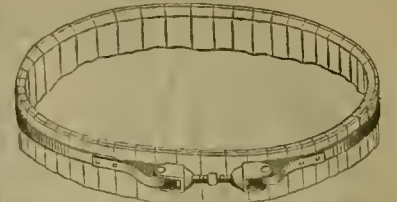
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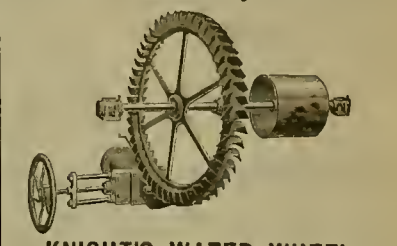
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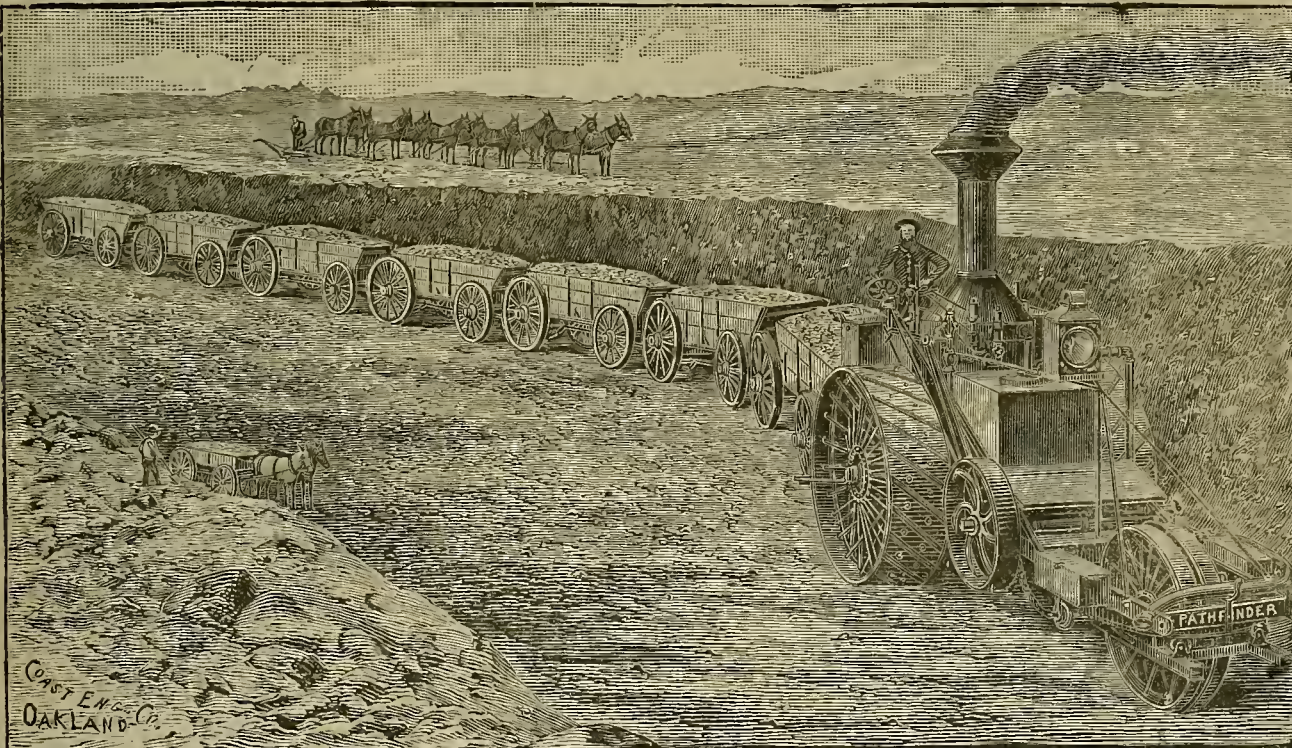
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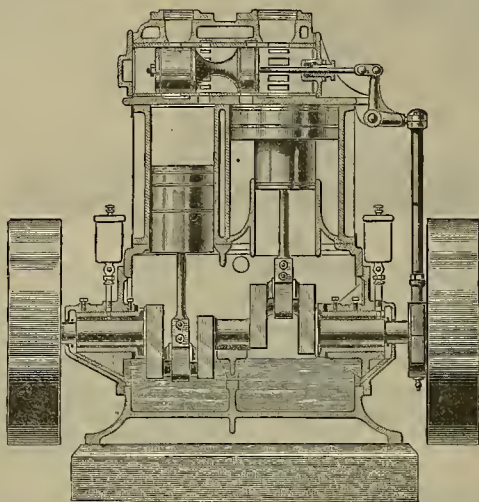
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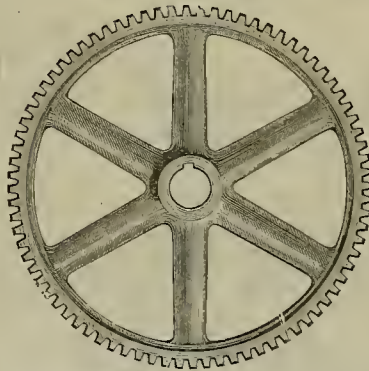
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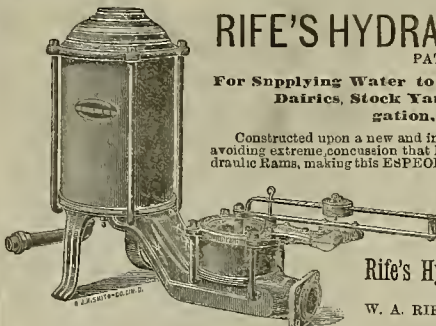
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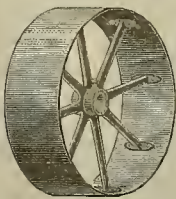
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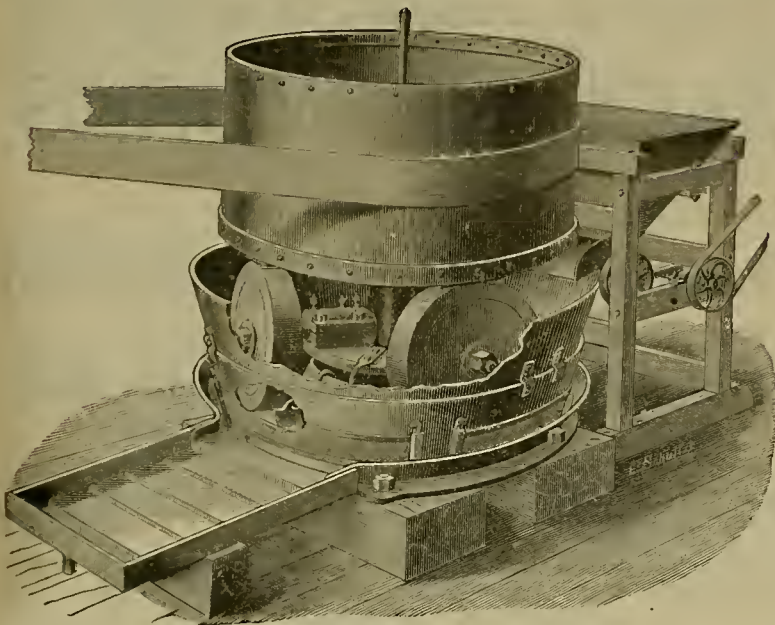
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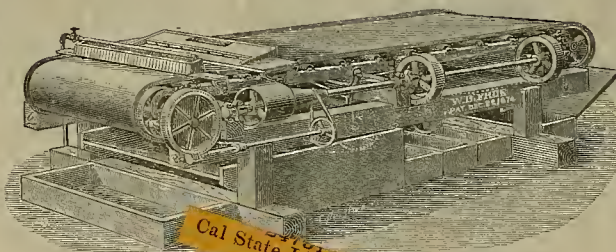
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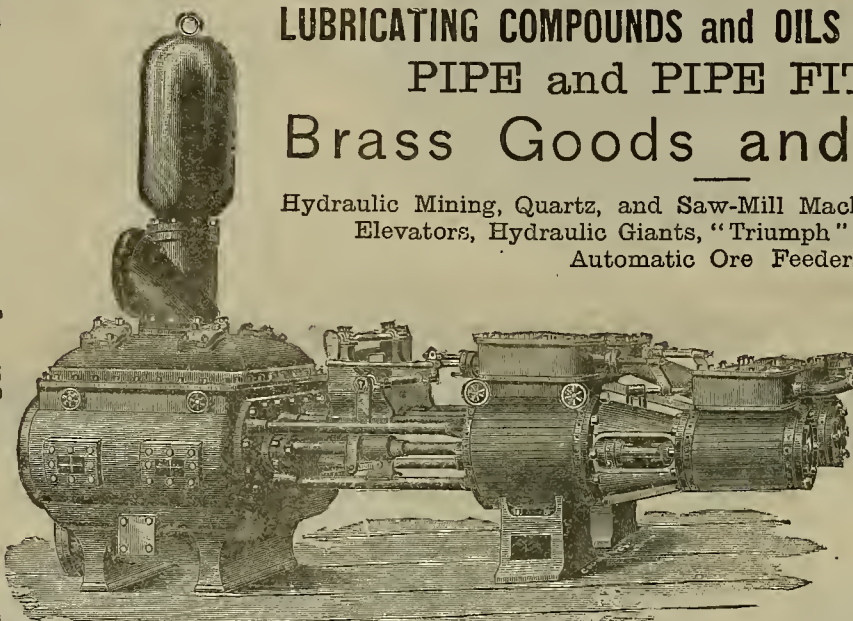
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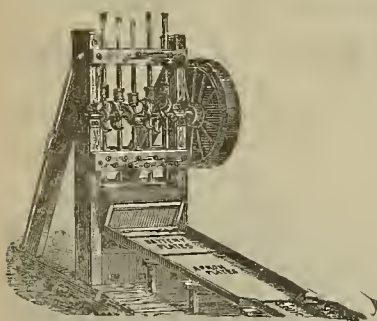


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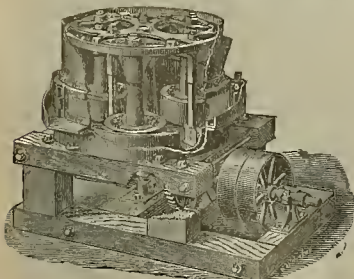
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The Yosemite National Park.

[Written for the Press.]

The accompanying map will indicate to some extent the area and resources of the recently created Yosemite National Park. It will be seen to embrace nearly 42 townships, making about 1500 square miles, or 960,000 acres—less 36,111 acres comprised in the Yosemite grant, which, with all bona fide entries, are exempt from the provisions of the Act. The principal purpose in reserving this magnificent domain was to protect the Yosemite Valley itself and its great water-shed from spoliation, and conserve, while increasing, the manifold attractions of that marvelous locality.

It is to the State Geological Survey, under Prof. J. D. Whitney, that we are indebted for the first outlining of the scenic wonders of this

wildly picturesque region. Until then, and long subsequent thereto, it was only indifferently known to the occasional hunter and irrepressible prospector; but, as time rolled on, the abundance and variety of its succulent grasses attracted the sheep-herder and his myriad flocks, who, in ungrateful return for the free pasturage thus accorded him, not only turned those beautiful mountain gardens into dusty deserts, but devastated immense areas of its primeval forests with devouring fire. On the very last occasion that I pulled myself up, by the Anderson rope, to the summit of the "Half Dome" from that central and lofty standpoint, I counted no less than nineteen forest-consuming fires burning in nearly every direction. But now, thank God, the California delegation, and Congress—yes, and the President of the United States for approving the

Act, the hands of the despoiler and vandal are from henceforth to be legally paralyzed.

It may be pertinent in this connection to say that not only do the forests and lofty peaks of the Sierras attract moisture, but Nature utilizes the rain and snow-distilling clouds throughout these vast solitudes, by building there her great reservoirs of snow, with which to supply the thirsty earth with life-giving madefaction during our dry and lengthy summers, and to make the springs and streams that run among the hills jubilant with unceasing songs of gladness, throughout the year; and the mighty forests, throwing their protecting arms of shadow over and around them, guard the precious treasures from untimely liquefaction.

This beneficent and timely provision alone should be sufficient to merit the eternal gratitude, not only of our own people, but of the

lovers of the beautiful and the admirers of the sublime and marvelous in every civilized land, that Congress has created the Yosemite National Park and the Sequoian National Parks.

But when it is remembered, in connection with the noble Sequoias, that in Miocene times and the Tertiary period there were, according to Prof. J. G. Lemmon, the gifted and industrious hotanist of the State Board of Forestry, over 20 different species of this remarkable genus, as proven by fossil data from various parts of the world, yet now there are only two living species left, the big tree and the redwood, and those found only in California, is not this fact of itself a sufficient justification for reserving and preserving all of the Sequoias

*See Third Biennial Report of the California State Board of Forestry for 1889-1890, pages 167, 158.

(Continued on page 121.)

CORRESPONDENCE.

We admit, unadvised, opinions of correspondents.—Eds.

Mines Around Angels.

[From Our Own Correspondent.]

EDITORS PRESS:—The mines of the camp are on the mother lode, its forks and mineralized bodies near to the lode. The Madison, Gold Cliff, Stickle, Bennett, Lindsey and Pioneer follow in succession on the main mother lode; the Suffolk G. M. Co.'s veins, parallel to the north; then the Excelsior and El Dorado fill in and are paralleled in turn by the Fletcher and Crystal. Following these on the east come the Stickle, Utica and Lightner, while to the north of all these mines lies the Angels Quartz M. Co. property. It will be seen that the section has four parallel deposits or veins, each about 600 feet distant from each other and all in or adjoining the town of Angels.

The Madelon.

This mine is now owned by A. J. & T. M. Lane. They have run a drift from the surface 400 feet on the center vein, stopping out from 20 to 27 feet in width. As the three veins are all within 100 feet of space, and the entire width is mineralized, it might be called a vein of 100 feet in width, the vein-matter in quartz and talc slate averaging, from the 400-foot drift, \$2.50 a ton, though some months have shown an average of \$2.80. In addition to the free gold, the ore carries an average of 20 per cent of sulphurets that average in value \$55 a ton. The mine has a complete ten-stamp mill with water-power; the daily capacity of the mill is 30 tons. This mine has paid its way from the start, and when equipped with 40 to 80 stamps will come to the front as a halion-producer; as it is, the property is a very nice thing to own. Adjoining is

The Gold Cliff.

This mine is being worked under bond and lease by Messrs. C. D. Lane, W. E. Shephard and Woodson Garrard, with Mr. Woodson Garrard as superintendent. Previous to the present owner's possession, various methods by different parties had been tried on the ore; one after another was discarded, and finally the old-fashioned stamps were set to dropping, but they failed to make the mine profitable. Then, when others had failed, the present lessees took hold and Mr. Woodson Garrard soon had it a paying property and has steadily added to the net profits. The vein is now 60 feet in width of talc slate and quartz of an average value of \$1.50 a ton. The ore carries two per cent of sulphurets assaying \$55 to the ton. The mill is of 20 stamps with water for power, and crushes 60 tons of ore a day at an average cost for mining and milling of 65 cents a ton. Mr. Garrard has every reason to be proud of his success, and the other lessees to congratulate themselves on their good fortune. The Stickle & Bennett, Lindsey, Excelsior, El Dorado & Pioneer are each awaiting capital to take hold and turn their hidden values into golden twenties.

The Suffolk G. M. Co.

Mr. C. D. Smythe is superintendent and joint owner of the mine. The ore of this property differs from those of the other mines in this section. Tellurium, copper pyrites and various combinations are encountered, which promise to make this in time a valuable property. At present, pending the settlement of an estate, the property is idle.

The Angels Quartz M. Co.

J. V. Coleman, owner—G. H. Fox, superintendent. This property contains within its side lines the extensions of all the mines in the camp, save the Pioneer and Suffolk. Almost the entire width has been crosscut at various depths, and ore encountered that has convinced the superintendent that if sufficient stamps were furnished, the entire width of the property could be worked to a profit. The mine is closed for the present, awaiting the erection of a large mill the coming spring.

The Utica.

This property dates back to the early days of quartz-mining. The surface ore was worked from time to time by arrastra process at irregular intervals, Senator Fair working the mine out (?) Finally the property came into the hands of Mr. C. D. Lane and some miners associated with him. Under Mr. Lane, the old mine began to grow, until satisfied that they had sufficient in sight to attract capital, when the attention of Messrs. Hayward & Hohart was called to the mine. Mr. Hayward inspected the property in person, and after sinking 550 feet, brought two-thirds of the mine, Mr. C. D. Lane retaining his one-third and being continued in charge as superintendent. From the time of purchase until the present there has been a continuous effort made to put the property on the best possible basis. First two shafts, each of 550 feet in depth, were put down and the vein crosscut and developed; then the mill was increased to 60 stamps, and two miles of pipe put in to connect with the mine's private ditch. A sawmill for framing timbers was added and a large air-compressor, sufficient to drive 12 drills, put in. It seemed as though the limit had been reached, but the owners continued and added the Stickle mine with its 20-stamp mill to the Utica, and put that shaft down 600 feet. Then to com-

plete the plant, the Union Water Co.'s entire system of reservoirs and ditches was added. In addition, the Angels Chlorination Works were purchased and their capacity doubled. With this was added the mansion for the superintendent's offices, shops, stables and every detail requisite in the working of a large mine on a successful basis. The company is not given to publishing bulletins of its business, and in consequence it is not an easy matter to make a correct estimate of cost of plant, value of ore, and profit enjoyed. It may, however, be safely estimated that the plant represents an investment of nearly half a million dollars. The vein is from 17 to 35 feet in width, of an average value of \$4 a ton, which ore is mined and milled at a cost not to exceed \$2.25 a ton; that the 60-stamp mill—which is a model in every way—crushes 3 tons to the stamp every 24 hours, giving a net profit on 180 tons at \$1.75 a ton, of \$305 a day from the Utica mill alone. Once the Stickle is fully equipped, it can be counted on to do equally as well, or swell the proceeds to \$610 a day from the mine alone, independent of the revenue derived from the sale of water to all of the other mines and for irrigation. The chlorination works contributes its proportion in addition. I have thus tried to show, not how much the owners are making from their investment, but what can be made in working a \$4 vein on business principles, with the necessary capital and competent management. The affable superintendent, Mr. C. D. Lane, is the same "Charley Lane" that he has always been, and it will take more than a Utica to make him otherwise. In his work he has been ably assisted by the practical men that he has called to his aid. Under Mr. Joo. Reaver, the mill moves with the regularity of a clock pendulum. Next to the high degree of perfection that has been attained in the automatic plan of the mill, the most noticeable feature is the absence of unnecessary men. I have at no time seen more than three men in the entire mill. The vim and push that characterized the miners and everything connected with the mine, together with the evidence of a close attention to details, is traceable directly to the mine foreman, Mr. C. A. Lillie. Not only his eye but his person is everywhere at one time; quick, energetic, watchful and competent, he has proven himself the right man in the right place. While he may be equaled, I have met no mine foreman that could excel him.

Over the home of the superintendent, his estimable wife presides, extending a kindly hospitality to all who are so favored as to be her guests. Of a well-known mining family (the Garrards), she enjoys the enviable distinction of being called "as good a miner as her husband." In consequence, she "dips" into the "faulter" in mining without a "break," "shoot"ing off many a witty "shaft" as she "picks" her way along the "track" and "sets" her opinion before the listener with the "selvage" that "caps" the "apex" of the "vein" and "lodes" the hearer with a fund of information that is only equaled when with "ca(l)m"-ness she "drops" into the mill and "amalgamate" her remarks, "tapp(t)ing the floor with her "shoe," that you may the more "quok"-ly "die"-gest the "concentrated" remarks that are so dealt out to you by one who is an exceptional helpmate and most charming hostess.

Utica Chlorination Works.

These works are the property of the Utica mine, and are in charge of Mr. T. N. Smith, under whose management they have been reconstructed, their capacity doubled and the plant made as complete, and as good results obtained as in any chlorination works on the coast. With the two furnaces the capacity of the works will be 6 tons of concentrated sulphurets a day; \$20 a ton is charged for treatment and about 10 per cent deducted for loss.

The Union Water Co.'s Ditch

Is now the property of Messrs. Hayward & Hohart. This water system is one of, if not the oldest, in the county. The source of supply is the Bear river and the north fork of the Stanislaus river; added to this are reservoirs that catch the water from the melting snows and hold them until they are carried over the mountains to the mines and gardens 30 miles below. The mines consume about all of the present water supply in dry seasons. It is the intention of the owners to increase the storage capacity, enlarge the ditch and make the property second to none. The ditch has before it a great future not alone in the supply of water to the various mines, but to it and from it must come the future prosperity of all the foothill section from Murphy's to Copperopolis.

In this belt are thousands of acres on which the orange, fig, olive, peach, apple, pear and vine can be grown to the greatest degree of perfection and profit, on lands that can now be bought for an equal number in dollars that similar land in every particular now commands an equal number of hundreds of dollars in other localities. In this one branch the State today owes her greatest measure of prosperity from the fact that these old mining ditches have caused the foothills to become golden in their wealth of fruits, watered by the ditches of the ennobled and suppressed hydraulic mining industry.

Altaville Foundry and Machine Shops.

No small degree of the profits attending mining in the Angels mines is due to the fact that at Altaville, which may be said to be an extension of Angels, Mr. D. D. Demorest has erected and equipped a complete foundry and machine shop, furnishing a large part of the

castings required in the operation of the mines and mills, and making all the necessary repairing. That this convenience is appreciated is evidenced by the large amount of work that is constantly turned out from the shops.

Angels has the miner, water, climate and every requisite to successful mining. In time capital will take hold of the numerous ledges now idle, but known to be equally as good as those being worked, and then Angels will come to the front and take the position she is destined to fill as "the best mining town on the coast."

Murphys, Cal.

E. H. SCHAEFFLE.

What Is an Anti-Cyclone?

Lieutenant Finley has issued a bulletin explaining the use of the term "anti-cyclone" in meteorology. A former bulletin dealt with the cyclone. The later bulletin reads:

The employment of the term anti-cyclone for meteorological purposes naturally follows the use of the word cyclone. The prefix anti indicates the existence of a circulatory system in the air directly contrary to that which prevails in the cyclone. As the circulation of the air currents differ widely from those of the cyclone, so also are the accessory phenomena of an opposite nature. The anti-cyclone is an area of high barometer in which the atmospheric pressure is decidedly above the normal. The highest pressure is at the center and diminishes thence outward to the circumference. The circulation of the air is spirally outward from the center. The air does not attain a circular motion anywhere within the area, and the tendency to a spiral movement is only disclosed when the whole disturbance is charted and observations from every quarter are available. The circulation of the air in an anti-cyclone gives rise to westerly winds on the north side of the center, northerly winds on the east side, easterly winds on the south side, and southerly winds on the west side. The four quadrants of an anti-cyclone are distinguished as follows: In the N. E. quadrant, clear, cold, dry weather, with winds of moderate force; in the S. E. quadrant, a cold wave, with the lowest temperatures, clear, dry air and high winds; in the S. W. quadrant, fair, cool, pleasant weather, with gentle winds and haze; in the N. W. quadrant, increasing temperature, increasing humidity, cloud formation and threatening weather.

The front of an anti-cyclone is the extreme rear of a cyclone, and the extreme rear of an anti-cyclone is the front of a cyclone. The air moves downward and outward in an anti-cyclone and inward and upward in a cyclone. The air which flows outward from the top of a cyclone is cold and dry because deprived of its heat and moisture in the development of rain or snow. This air descends toward the earth's surface and gives rise to the formation of the anti-cyclone. There is always an anti-cyclone between two cyclones, both of which are feeding the former and maintaining its identity. The cold weather of an anti-cyclone is partly due to the descent of cold air from above, the horizontal flow of cold air from the northern regions and the effect of radiation, which is greatly augmented by the absence of vapor and clouds. The area of the anti-cyclone is frequently greater than that of the cyclone and its form less regular. Anti-cyclone is synonymous with clear, cool weather, moderate winds and a cold wave; and cyclones with cloudy weather, rain or snow, high winds and warm wave. The word "high" on the weather map indicates the area of an anti-cyclone, and the word "low" the area of a cyclone. Both disturbances are beneficial and necessary to the prosperity of mankind.

THE EMMA MINE is getting in fine shape, and now has lots of ore in sight. A few days ago workmen uncovered another body of very fine ore at a point 200 feet below the surface. In the southeastern portion of the mine, and which is believed to be a continuation of the ore struck last summer. The rich ore is two feet wide, while there is a large amount of good, concentrating ore. The first class is being taken out ready to send down to the smelters, while the second class is being piled up ready for concentrating in the spring. Sup't Wallace says the mine looks better than it has for a number of years; in fact, is looking fine, and that they will be able to ship a great deal of ore. Just here comes an important question. The old tramway is so worn out that it will require new ties, new rails, and, in fact, almost rebuilding entirely to make it answer the purpose of bringing down ore and taking up supplies. Last month the Emma Co. sent down 30 tons of ore by teams at considerable cost of fixing the wagon-road, but now it is proposed to ask aid from the county in rebuilding the wagon-road so it can be used at all seasons.—Salt Lake Tribune.

THE NICARAGUA CANAL.—Ex-Senator Warner Miller of New York, President of the Nicaragua Canal Construction Co., has accepted by telegraph the invitation lately extended to him to visit San Francisco to address our citizens on the Inter-oceanic canal. The following organizations joined in extending him the invitation: The Chamber of Commerce of San Francisco, the Board of Trade of San Francisco, the California Academy of Sciences, the Geographical Society of the Pacific, the Mechanics' Institute of San Francisco, the Produce Exchange of San Francisco.

Gold Placers in Nevada.

The Placer Mines of White Pine County.

We are in receipt of the report of the Surveyor-General and State Land Register of Nevada for the years 1889-90, with the accomplishments of J. E. Jones, State Land Register. It is a valuable book of 200 pages. Concerning the placer mines of White Pine county, we extract the following from the report:

In White Pine county the Osceola Gravel Mining Company owns very extensive and valuable properties. This company has been operating at Osceola for several years. It has expended a large sum of money in bringing water a distance of 18½ miles to its mines, and from information at hand the mines are yielding a fair profit on the capital invested. The output of this company's mines for the years 1889 and 1890 was \$40,000 in value. The gold is often found in large nuggets containing more or less quartz, and is also found in very small pieces or scales. The new and long ditch of the company was completed too late to be of any avail this season, but a plentiful supply of water is assured for the future. About 35 men are employed by the company from four to six months of the year. James H. Marriott is the superintendent.

The hills above this company's mines are covered with quartz veins, showing good prospects, and would prove to be good paying mines if the owners were able to properly develop them.

There are quite a number of placer mines in the district worked with rocker, sluice box and dry-wash machines that have in the years 1889-90 cleaned up a total of about \$10,000. Almost any of the side gulches will pay from \$1 upward per day to the man by the dry wash process during the dry months of the year. It is certain that better times are in store for the camp of Osceola.

Robinson Placers.

At Ely, in Robinson district, the Robinson Consolidated Gold Placer Mining Company owns some very valuable property, comprising 8000 feet by 600 feet of placer ground. The prospects of this company's property are very bright. Three shafts have been sunk in different portions of its ground, which has demonstrated the fact that there is at least 35 feet of good pay gravel from the surface to bedrock. One test containing 300 pounds of pay dirt yielded \$5 in gold. Owing to a scarcity of water, this property is now lying idle. It is expected, however, that a sufficient supply will be obtained from the drainage of the quartz mines in the immediate vicinity which will enable the company to prosecute its operations successfully. The gold product of this district for the year 1890 was \$14,000.

PROCESS FOR REFRACTORY ORES.—The London *Financial Times* gives the following description of a new patent for the reduction of refractory ores, which is being used by the Gold Ores Reduction Company of England, with satisfactory results: "The principal feature of this process appears to be its simplicity and inexpensiveness. There is nothing complicated about the method by which the reduction of refractory gold ore is obtained. The ore, having been ground to powder, is transferred into a furnace, where it is subjected to a thorough roasting by hot air, with the result that a complete oxidation of the intractable sulphurets and arsenical ores takes place, the gold being freed by these artificial means. The next step is to pass the ore—now in the condition of a fine rouge-like product—to the amalgamator, where the powder is ground with water until the gold has flown to its natural amalgam, when it is drawn off and is ready for retort distillation in the laboratory. A furnace, it is stated, can be erected for £200, and, as a rule, from each material as are to be found in the neighborhood of any mine, while the cost of treating a ton of ore amounts to something like 7s. 6d. only. The ore from the Mount Torrens mine, treated by the ordinary process, is said to yield but 5 dwts. of gold to the ton, whereas by this company's process the result is, roughly, one ounce of gold and two ounces of silver per ton—an astonishing difference in the yield."

CALIFORNIA INVESTS.—A California pool, composed of J. C. Duran, Chas. N. Fish and Jno. McComb Jr., have begun operations in Okanogan county. Through their representative, Geo. Plunder, they have just purchased the Yukon and Elgin mines in Ennes district. Both of these are prime properties, the Yukon showing a six-foot lead carrying gold and silver. The Yukon has had considerable work done on it, one tunnel having been run in 40 feet on the vein and showing 18 inches of soft carbonate. The Elgin has a five-foot vein, carrying gold and silver. The syndicate will make other investments here, but will not begin development operations until spring.—*Ruby (Wash.) Miner*.

THE long tunnel in the Bear Valley and Alessandro pipe-line was completed Tuesday. It is 2300 feet long. Six miles of the two-foot steel pipe-line are in. There are four more miles to lay.

LAST YEAR at this time the rain gauges at Mattole, Humboldt county, registered 90 inches. This year they only mark 17.24 inches.

Amalgamation at the Comstock Lode.

A Historical Sketch of Milling Operations at Washoe and an Account of the Treatment of Tailings.

NUMBER II.

[By A. D. Hodges, Jr., Read before the American Institute of Mining Engineers.]

VI. Mechanical Improvements.

Paul's Pioneer mill, so hastily planned and built, was naturally very imperfect. In the structures which followed it, great mechanical improvements were rapidly and continuously made. The stamp, which early in the '60s crushed only 1 ton per day, in 1878 was crushing 4 tons daily through No. 5 slotted screen. In his second mill, Paul used the Howland rotary battery; but this contrivance found only very limited acceptance at the Comstock. Steam-stamps were tried once at Silver City, but were adjudged a failure after a very short run. The ultimate Comstock verdict has been in favor of 850 to 900 pound stamps, dropping about 100 times a minute, crushing wet through a slotted Russia-iron screen and working on a very solid foundation. The latest mills have mortar-hocks 16 feet long.

The pan received more attention than any other part of the mill, and numberless patterns were invented and tested. It received a variety of dimensions and proportions, was used to do all the crushing, none of the crushing, only a part of the crushing; was employed to effect the complete process of amalgamation, or was supplemented with settlers, agitators, concentrators, etc. It had flat bottoms, and curved bottoms; and the wings, mullers, shoes, and dies, in short, all its component parts, were varied in shape, in accordance with mathematical theories of personal idiosyncrasies. To describe each style of pan made and tried in practical work would demand large space. Some idea may be obtained of the diversity of opinion among mill-men concerning the construction and proper work of the pan from the following list of the amalgamating apparatus in use at the Comstock in 1866:

In the 62 mills, described in the MINING AND SCIENTIFIC PRESS of Sept. 29, 1866, there were (besides 25 roasting furnaces and 61 barrels) 10 rock-breakers, 1280 stamps, 1032 pans and tubs, 227 settlers, 44 agitators and 2 concentrators.

The 1032 pans and tubs were thus classified: 83 tubs, 13 grinding pans, 337 Knox pans, 226 Wheeler pans, 188 Hephurn pans, 66 Varney pans, 24 Wakelee pans, 56 "plain" pans and 39 pans not specified.

According to the best Comstock practice of the present day, the mills are given full stamp-capacity, and only a comparatively small amount of grinding is done in the pans. The pan-construction is solid and simple. The bottom is flat and the miller is plain, with ample spaces between it and the pan-sides and pan-cone to allow free circulation of the pulp. The wings are shaped like inverted plow-shares, and the angle of draft for the shoes and dies has been determined with more or less exactness for the usual speed, but variations within moderate limits are allowed. The usual pan-diameter is 5 feet, and the usual pan-charge is about 1½ tons of ore. The gearing underneath is plain and open. The shaft is often made with a downward taper for ease in babbling, and the bearing is at least 18 inches long. The pulp is generally quite thick, and the miller-escape rapid—90 revolutions per minute for a 5-foot pan. The settlers have preferably inclined bottoms, are about 8 feet in diameter and make 15 revolutions per minute. A couple of agitators are used in each mill, but with fine grinding and careful running of the settlers, they are not absolutely necessary. It is advisable, however, to have them.

VII. Deficiency of Metallurgical Knowledge.

While with much ingenuity and thought the mechanical details of the Comstock mills were elaborated and brought to a high degree of perfection, the chemistry of the Washoe process received inadequate attention. The list of educated metallurgists who have been employed at the lode is exceedingly small. Of those who have held important positions, I can now recall only three: Louis Janin, Guido Kustel and Melville Attwood. Kustel and Attwood left Washoe about the time of the practical abandonment of the "Freiberg process." Kustel's influence there being afterward limited to whatever may have resulted from his writings; Janin remained for years, and his work (with the assistance of his brothers) produced important effects.

In explanation of the scarcity of metallurgical talent, it may be well to recall certain customs and conditions which have prevailed.

Mining operations at the Comstock have always been conducted simply as a basis for stock-speculations. The mass of the shareholders never inquired into the details of the mining-work. As to milling, it is a question if the majority ever gave a serious thought to it. They knew, in an indefinite sort of way, that it was a profitable business which was a prerequisite of the management. They felt powerless to get this plum away from the mill-companies, and "let the matter slide" as something too small for them to bother with. With a stock liable to jump up hundreds of dollars per share, they cared little about mill-profits of only a few dollars per ton. The business of the mills, they considered, whenever they thought

anything about it, was to rush through as much material as possible in order to pile up dividends and build the stock-market. The average stockholder never intended to hold his stock long. He bought with the expectation of realizing a fortune by selling out in a month or so. All this made matters comparatively easy for the mill-companies, which were close corporations and never sold a share of their stock to the general public. The mill, within certain limits, could make any terms it pleased with the mine, when the mill-owners formed the mine-directory.

The mills were popularly supposed to guarantee a yield of 85 per cent of the precious metal, but the precise form of guarantee has never been made public. Exactly what percentage they extracted, has never been discovered. No one ever knew it, neither the superintendent of the mill, nor the manager of the mine, nor any other person. Figures have been given, but these were merely approximations at the best.* There never was time enough to sample carefully and assay properly the mine-products. Such a procedure, moreover, it accepted as a rule, would have interfered materially with stock-manipulations.

After Sharon's system had been adopted, none of the mills, and only a few of the mines, had an assay-office. It grew to be a custom that there should be a single assay-establishment for all the mines and mills controlled by each "ring." Great pains were taken to conceal, from all except the favored few, the results of such assays as were made. It is a well-known fact that, in the earlier years, worthless material was often mined and milled. This must have been done to a very large extent; for the tailings of many mills where part of the ore worked was certainly rich, were found afterward to average only a couple of dollars per ton.

A peculiar custom which existed at Washoe may be mentioned here, although it does not bear directly on the subject under consideration: Reclamations on bullion which had been melted and assayed in a custom-assay office were paid by the assayer. It may be necessary to explain that the bulk of the bullion-product was purchased by a few parties who paid in full (to responsible persons) on delivery of the bullion. The bars were stamped with their assay-values (i. e. the silver reckoned at \$1.29 and the gold at \$20.67 per fine ounce), and were sold at a discount therefrom (calculated in per cent) which was made to cover charges, depreciation in price of silver, etc. If, for example, a bar was stamped with a value of \$20,000, and sold on this basis, and the purchaser subsequently decided the true assay-value to be only \$19,500, he made a "reclamation" of (about) \$500, which was paid, not by the seller, but by the assayer. The custom-assayer, therefore, was careful not to over-stamp a bar. This system had its value for the buyer, but by what process of reasoning the bullion-producer could find in it any advantage to himself, it is difficult to understand.

The system of mill returns has been much criticised of late years. To show how it originated, a brief account of the usual mill process is necessary.

The ore is raised from the mine in cars, the weight of whose contents is known with more or less exactness, and transported to the mill. Here, after the larger pieces have been reduced to a suitable size by rock-breakers, it is crushed with water under stamps. The stamped material is run into a series of tanks inside the mill and settled, the number of tanks varying with the size of the mill. The finest and most clayey particles of ore, called "elimes," are carried by the current through the tanks, where only a part is caught, while a considerable amount, in proportion dependent on the character of the ore, the fineness of crushing, and the settling capacity of the mill, escapes in suspension in the water to the outside of the building. The coarser and heavier material, which collects in the tanks, and is usually called "sand," is removed to the pan-floor, where, in the best-conducted establishments, it is sampled for assay. It is then amalgamated in the pans, whence it is discharged into settlers, where the pulp is thinned with additional water, and the amalgam and quicksilver are separated out and caught. The earthy residues, now known as "tailings," after passing through agitators for the collection of any amalgam and quicksilver which may have escaped from the settlers, are washed through sluices to the outside of the mill.

The mills work the ore at a given charge per ton crushed, and return the bullion which is extracted.

In former years the millman was unable to work the "elimes" and "tailings" at a profit, and they were allowed to go to waste. Hence, as a matter of fact, the mine received only the bullion obtained from the "sand." When, at a later period, it was found profitable to rework the tailings, and still later to work the elimes—a matter of gradual development—no change was made in the system of returns. The mine was still credited only with the results of treat-

ing the sand; the elimes and tailings were considered the perquisite of the mill. In other words, that which was caught inside the building belonged to the mine; whatever was caught outside belonged to the mill.

Under such conditions as those above mentioned—milling conducted simply as a gamble—the great mass of stockholders (anxious to realize sudden fortunes) demanding that every effort should be made to increase production without regard to cost, and caring little how much metal was wasted by rapid treatment, it only dividends could be increased temporarily, with no exact knowledge of the amounts of gold and silver in the ore, and with mills receiving a fixed rate per ton whether the material was rich or poor, and sure of supplies whatever the yield might be—under such conditions it naturally came to pass that the main object of the millman was to work the ore as rapidly and cheaply as possible, and that close amalgamation was secondary in importance. Hence it was that, while all the machinery was improved and brought to a high state of efficiency, the chemistry of the process received comparatively little attention.

The Gold Hill surface ores first worked by Paul contained more gold than silver. Much of the gold was free, and much of the silver was apparently in the state of a simple sulphide, which is reducible by quicksilver alone, the action being hastened by contact with iron under the favorable conditions existing in the pans. It is very possible that Paul might have obtained as good results without his chemicals as he did with them. However this may be, certain millmen found that they could get a high yield without any chemicals (as happened to Kustel when treating the Ophir surface ore), and others were unable to extract a satisfactory percentage either with or without them. There has always been a popular impression that all the ores from the lode have substantially the same chemical composition. Concerning the constitution of these ores, we know surprisingly little. A few analyses have been published, but these have been of specimens rather than samples. We do know, however, from milling experience, that important differences exist between the materials extracted from different spots on this huge vein, which has been opened for a length of four miles, and to an extreme depth of about two-thirds of a mile.

The early millmen, deficient in metallurgical knowledge, and ignorant of what sort of material they were treating, worked on blindly, as best they could. When they fell into difficulties, a host of process-vendors sprang up to confuse them. All sorts of substances were tried, nearly all of them of no possible virtue, and all tested by most unsatisfactory methods. As the quacks pretended to be scientific men, science soon fell into disrepute among the workers, who were unable to distinguish between the genuine and the false article, and the "practical" men, after the failure of numberless "processes," settled down to the results of their individual experiences. Bluestone and salt, either separately or jointly, always had their adherents, although for many years they were used in such homeopathic doses (in order not to "base" the bullion, against which there was a strong prejudice) that no appreciable effect could be produced. But the amalgamator who happened to make a good run when using one of these reagents was apt to remain thereafter a sturdy believer in the merits of the particular chemical employed. As each millman backed his belief with statements of percentages extracted—or supposed to be extracted—there was for a long time a confused complication of ideas concerning the values of these chemicals, which continued until the experiments with tailings, made in 1867 and 1868, by the Janin brothers, solved the problem beyond dispute. Even then, the stamp-mills did not adopt the intelligent use of bluestone and salt until about 1875, some five years after the successful introduction of the method at the Meadow Valley mill, near Pioche. Before this date, the Washoe mills, after employing various chemicals in most irrational ways, had gradually come to use merely what was deemed essential for keeping the quicksilver clean.

VIII. Early Attempts to Work Pan Tailings.

The elimes often assayed as high as the original ore; but for years they were run to waste, as no one knew how to work them with profit. The pan tailings, holding considerable amalgam, were treated more or less successfully from about the year 1864. The usual treatment consisted of concentration on blanket sluices, followed by amalgamation in pans. The blanket sluices were shallow troughs, with eldes an inch or two high, covered with coarse blankets, and set at a small inclination—6 to 12 inches in 12 feet. Two or more troughs were placed side by side; or, in the improved form, one wide blanket table was divided into several narrow, longitudinal compartments by parallel strips of wood. The stream of tailings from the mill, with an additional supply of water, was allowed to flow over the blankets, which caught and retained the heavier particles of ore and the amalgam and quicksilver, while the lighter and poorer material was washed away. The operation was aided by a man with a broom, who lightly swept the sluices, keeping the material evenly distributed and exposed to the action of the current. Two or three times a day the blankets were removed and washed out in tanks. A later and less laborious method was to leave the blankets in place, and with

*That is, to reduce the fineness of the bullion.

the aid of large amounts of clear water, to sweep the concentrates into the tanks through connecting troughs placed at the lower ends of the sluices and covered over except when in use.

There was no particular process of amalgamating the concentrates, but the procedure was similar to that employed for the ore. The richness of the concentrates consisted largely of amalgam, which fact made their successful treatment an easy matter.

The land in the main canyons leading from Virginia City to the Carson river was divided up into small properties which originally were taken up as separate millsites. Many of the mills were located in these narrow canyons, close to the water-course. Owing to the smallness of the sites, these mills, as a rule, could have only short lines of sluices, and when the treatment of blanket tailings was found profitable, the owners of land commenced to pick up the material discharged from the mill sluices above them for re-concentration in the same manner. This was done by successive land-owners, the residues being enriched by fresh supplies from the quartz mills interspersed at intervals, until finally there were almost continuous series of blanket sluices lining Seven-Mile, Six-Mile and Gold canyons. Many of the small owners put up little amalgamating works, consisting of a pan or two, or an strata, or, in a few instances, of a barrel, using small water wheels as motors. Others merely collected concentrates and sold them.

The yield of blanket tailings, in 1867, was from \$18 to \$25 per ton and aggregated over \$150,000. The cost of treatment was light, especially for the small operators who did all the work themselves and had their material delivered to them for nothing. These increased and prospered until the gradual decrease in value of the tailings and conflicts with the water company in time drove many out of the business.

The trouble with the water company arose from the insufficiency of the natural supply of water. To remedy this, water companies (afterward consolidated into one, the Virginia and Gold Hill Water Company) collected all the available supplies in the district and brought in additional quantities from outside sources, distributing and selling the water at high rates. The water company claimed that it sold to mills (and sluices) only the use of the water. Acting on this theory, the company caught up the water when discharged from the sluices of purchasers, and carried it in flumes around the property of those who refused to pay for it. The small sluice-owners claimed that it was impossible to distinguish between the natural and the artificial supply, and that, moreover, all water once in a creek were free for the use of the riparian owners. Many refused to pay and tore down the company's flumes. The dispute lasted for years and was attended with violent acts and even bloodshed. The victory finally remained substantially with the water company, which built a small dam near Silver City and led the water and tailings coming down the creek (or the larger part of them) through a long line of flumes to the Woodworth mill, which was located on the Carson river, at the mouth of Daney canyon. Here the tailings were passed over a blanket table, 1700 feet long and 19 feet wide, divided into compartments each 19 inches wide by 130 feet long. This was, undoubtedly, the largest structure of the kind ever built.

After the use of the blanket sluices had been well established, reservoirs for impounding the slimes and tailings were built here and there. Most of those in the canyon were necessarily small, but those on the flats below the ravines were large. The impounding of these materials did not occur on an extensive scale until the process for working them had been brought to a point where success seemed certain. How this process was developed will now be told.

(To be Continued.)

REWORKING OLD CINDER PILES.—The reworking of the cinder-piles of the old-time Boonton (N. J.) furnace has of late been attracting some little attention. The old slag or cinder is not being worked over for the iron it contains, but is being made use of in large quantities in the manufacture of a mineral paint. The Boonton furnace from which the cinder came was one of the earliest blast furnaces in this country, having been in successful operation before and during the Revolution, and turned out large quantities of munitions of war in that period. The value of the cinder as a source of iron is shown from the fact that 1000 tons a week are being supplied to one furnace for reworking. The visible supply is said to be not less than 300,000 tons in one place. Most of the older-piles from the old furnaces in Western Pennsylvania were reworked between 1860 and 1870 during the period of high prices for iron ore then prevailing, and it is now reported that some of these which were overlooked or considered worthless in those days are now being overhauled and made to give up the iron which in the earlier days was allowed to run to waste.

The Tacoma smelter is a great success, and since last September has been sending down to this city 750 bars of bullion every five days. Each batch of bullion is worth about \$18,000.

The average yield from 6355 tons of Cons. California and Virginia ore in January was \$15.64 per ton. The average assay value of the battery samples was \$19.34.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

KENNEDY.—*Ledger*, Feb. 14: This grand mine, unquestionably at the head of the bullion-producers of Amador county, is moving along at a prosperous gait, under the able management of J. F. Parks, to whose judgment in its management is mainly due the fact that it stands to-day on such a solid and satisfactory basis. The north shaft has been sunk to the 1300-foot level, and the work of sinking the sump is now in progress. Much trouble is encountered on account of the volume of water; sinking does not average a foot a day owing to this drawback, notwithstanding the improved appliances for handling the water which have recently been put in. The mill is kept running to its full capacity. The rich ore is obtained from a number of small veins, which, mixed with the main ledge met with in the south end of the claim, while of low grade, is still of a paying quality, bringing the average up to a very flattering figure. The sulphurets works are not running at present, as the production hardly keeps pace with the rate of reduction. The works are able to reduce about two tons per day, while the output averages about 1½ tons. The sulphurets are probably the richest on the lode, running up to \$150 per ton. The mine and mill give employment to from 90 to 100 men.

HARDENBURG.—The crushing of rock from this mine at the mill of the Amador gold mine is completed. We are not able to give the exact result, but rumor says the yield was sufficiently satisfactory to induce those interested in the property to spend considerable more money in the effort to place it on a paying basis.

MISCELLANEOUS.—A portion of the Zeila mill is engaged in crushing rock from the Pioneer mine, which adjoins the Kennedy on the south. The ore is taken from a depth of 70 feet, and should it prove unprofitable, it will be by no means conclusive. Pay ore was not reached in the Kennedy until a depth of something like 900 feet was attained. The North Star has levied assessment No. 24 of two cents per share.

Calaveras.

THE MAUNA MINE.—*Chronicle*, Feb. 14: This mine, which is the south extension of the Dauphin mine, is situated in the Jesus Maria district, and is owned by B. K. and D. M. Mauna. Three shafts have been sunk at different places on the vein, in all of which good ore was found. No. 1 shaft on the south is down 38 feet, with a three-foot ledge in the bottom; No. 2, or middle shaft, has reached the depth of 60 feet. The ore taken from the bottom of this shaft assayed as high as \$250 to the ton. Shaft No. 3 had reached the depth of 40 feet, when it had to be abandoned owing to the lack of facilities for handling the flow of water that was encountered. A tunnel has now been started from the creek to tap the middle shaft. The developments as far as made, tend to show that the Mauna mine will prove a valuable piece of property.

El Dorado.

RICH STRIKE IN THE ALHAMBRA.—*El Dorado Republican*, Feb. 12: Years ago the Alhambra mine, in Kelsey mining district, was worked on a small scale, but the ore being very rich, a large amount of gold was taken out. Some of the owners not being practical miners, the thought of curtailing their dividends in order to create a fund for development work never occurred to them. The result was that their stopes were exhausted and money all gone. The mine then lay idle for a number of years and the timbers decaying, allowed the mine to cave in, closing it entirely. In that condition it had to wait for the coming of capital and enterprise to bring it to life again. Two months ago John M. Bryan and Sanford Hydorn bonded this property, and immediately commenced operations to open up the mine. They have sunk and substantially timbered a shaft through the old works, and last week struck the ledge at the bottom of the old level. They have sunk a few feet on the ledge and drifted a few feet each way on the vein, and are now taking out ore, showing more gold than quartz. This shaft is 70 feet deep, and they will sink it to 100 feet and then drift each way, north and south, on the ledge, when we expect to report the richest ore dump-heap that has been known in the county for many years. They have another shaft 700 feet south of the old works, on the same ledge, 54 feet deep, from which they are now taking rich ore. They have two whims, one at each shaft, for hoisting ore. Messrs. Bryan & Hydorn are feeling happy over their good fortune. The Jackson claim, situated in Kelsey mining district, has been located, abandoned and relocated many times in years past. A few months ago the Jackson Brothers of Sacramento located the ground and have sunk a shaft 30 feet deep on it in a body of porphyritic matter, with seams of quartz running through it. The fine material taken out prospects rich in free gold of a fine nature, the quartz seams are well sprinkled with free gold plainly visible to the naked eye. From indications it is believed that this vein of material is over 80 feet wide. Its present outlook is certainly very promising.

Inyo.

MINING REVIVAL.—*Index*, Feb. 11: The cheerful report reaches Independence that operations on an extensive scale will soon be inaugurated in the old Montezuma mine, which is in the foothills of the Inyo range, about six miles south of Alford on the Carson & Colorado railroad. The ore is chiefly silver lead carrying some gold and giving regular assays of fair grade. Owing to a peculiar combination of metals in the ore smelting was made difficult under the old working, and the burning of the Elina furnace some years ago resulted in shutting down the mine. It is said a large number of men will be engaged to work in the mine; that a five-stamp mill will be erected to concentrate the ore and shipments be made to Selby & Co., who are said to be largely interested in the venture.

Nevada.

DAISY HILL MINE.—*Grass Valley Union*, Feb. 11: Some tributers at work in the Daisy Hill mine have just made an important discovery. They followed a stringer that came in on the footwall of the vein, and after running on it some distance it opened out as a vein from 18 to 24 inches, being

strong and well defined and prospecting freely in gold. Some pieces taken from the vein were brought to town yesterday which showed well in free, coarse gold, and the quartz was of excellent appearance. This find may prove an important one, as showing that the true vein has been found. The Daisy Hill formerly prospected well near the surface, and considerable money was expended in putting up steam hoisting and pumping works, and in sinking a shaft and running drifts, but the work was not attended with profit and operations were suspended and the machinery removed. The mine had been idle for years, until the tribute work spoken of was commenced. The mine is now owned by E. F. Morse.

CALIFORNIA.—*Grass Valley Union*, Feb. 14: The California M. Co., incorporated to work the Pittsburg mine on Deadman's Flat, has sold sufficient of its stock set aside for a working capital to warrant the commencement of operations, and about the first of March will commence setting up hoisting and pumping machinery. The first work will be to clear out the old shaft and after that contracts will be let for sinking and drifting.

Orange.

THE EAGLE MINE.—*Orange County Herald*, Feb. 14: By invitation of Dr. C. G. Garrison the writer went last Wednesday with that gentleman, E. O. Davies and Surveyor Leslie to the mining camp in Rowell's Canyon near the head of the Santiago. We reached the mining camp about 9 o'clock and found that Dr. Garrison and son have not only a good showing of gold and silver, but what is more important, a fine "ledge" of pure water. They had been driven out of the shaft in the Eagle mine when they had gone down 70 feet. The water rose to the top of the shaft and is running over in a good-sized stream. Nothing daunted, they went down the steep hillside a few hundred yards and started a tunnel in to drain the mine. They had only gone in a few feet when water again began to appear and it is increasing as they advance. They will probably have a big flow before they reach a point beneath the shaft. They have another shaft on the same ledge which is full of water. Their mining properties are good and promise rich results in precious metals, but in our opinion their water claims are more valuable still.

Shasta.

STAR CITY.—*Shasta Courier*, Feb. 14: Twenty odd years ago a mining camp was established on the McCloud and Pit river divide, and called Star City. It is situated ten miles southwest of Bartle, and according to its location on the map, in Shasta county, and about one mile from the Siskiyou line. The camp at one time had many locators, but the ore, silver quartz in large ledge contains a great amount of sulphurets not easy to work, and the camp was abandoned by all except an old Yreka miner by the name of Stout, who has staid with his claim for 11 years, working in summer and fall in the mine, and usually coming out in winter and laboring elsewhere for wages to get supplies. The last number of the McCloud River *Pioneer* has this: "We understand that there will probably be considerable work done around in Star City and Grizzly Peak country just over the southern county line this coming summer. Stout is in the mountain 1300 feet at Star City and thinks he is close to the ledge, and expects to tap it in a rich place. We hope something of the kind will be done in this line, for a rich strike means quartz-mills, and the merry music of the falling stamps always denotes a prosperity that is not found in any other community."

NEW STRIKE.—*Redding Free Press*, Feb. 14: A new strike has been made in tunnel No. 3 of the Texas and Georgia mine. A sample of rock lies on the counter at the Bank of Shasta Co. rich in free gold and sulphurets. The ledge is six feet wide. This mine promises to be one of the best in Shasta county. B. Conroy, Judge Simonds and a gentleman from Delta, acting in the capacity of viewers of the new road from the railroad to J. B. Champion's mill, visited that section this week. From Mr. Conroy we learn that the road is about seven miles long—as fine a mountain road as can be found anywhere and with an easy grade. Within the past four months Mr. Champion has changed a quiet spot among the mountains into a hive of industry. A fine ten-stamp mill has been erected and is now in first-class running order on good-paying ore. A ditch three miles in length furnishes the water for power, and should the water give out every arrangement has been made for the employment of steam. A tramway 4000 feet long connects the mine and mill, and the ore is dumped into a bin and fed by a self-feeder into the battery. There is an abundance of ore both in the mine and on the dump. Some 30 men are employed in various capacities—getting out ore, timbering, running drifts, etc. Other locations owned by the company are being prospected. Mr. Conroy says that he has not seen anything in the county like the systematic working of this mine and mill, and every arrangement goes to show that Mr. Champion is a miner well acquainted with his business.

GOT THE ORE.—*Shasta Courier*, Feb. 14: A quartz ledge that crops out strong a few hundred yards from the town limits, and on the east bank of Middle creek, on the lands of A. Dobrowsky, has been prospected by "Missouri pot-hole" shafts and abandoned before a hole was made deep enough to bury a cat. Recently James Sutherland, late superintendent of the Niagara mine, French Gulch, and the Early Brothers took hold of the claim and put in earnest and substantial licks. The quartz taken out has been hauled to the Gem mill below town, reduced, and found to pay well. The indications now are that the mine is going to prove permanent and valuable, and that enterprise and well-directed industry will be rewarded.

PLACER MINING.—The fact that this placer mining season is a failure makes a very perceptible difference in business matters in Shasta county, as in the aggregate, the placer miners, although not making big strikes, usually put a large amount of money in circulation. The last year's mint report of placer gold-dust from this county was \$100,000. This year it will be but a small drop in the mint report. Stopping hydraulic mining on Cottonwood and Clear creek knocked this county out of considerable coin annually.

IRON MOUNTAIN.—*Democrat*, Feb. 11: For months a sale of this mountain bonanza to an eastern mining syndicate has been pending, and at last we have pretty reliable information that the sale is an absolute certainty, and all that now remains to be done is passing the deed for the money. For some months the deed has lain in escrow in

the Bank of Shasta county, while representatives of the syndicate have been examining the mine and testing the ore. A. S. J. McCoy and Fred Grotefend, through a Mr. Bryant, negotiated the sale. Mr. Bryant will arrive here in a day or so, perhaps on this evening's train, when, we understand, the sale will be closed. In connection with this big transaction we hear much talk about a large smelting works to be erected on the river in the vicinity of Copley, also a railroad from Copley to the mine. At any rate it is a fact that within the past week the new company has had men surveying around the old Kies place one mile below Copley and doing other field work, which, taking into consideration the magnitude of the mineral deposits at Iron Mountain, and the large amount of capital behind the new enterprise, strongly indicates the erection of a smelter and a railroad to the mine. This is the best piece of news we have been able to give the readers of the *Democrat* in years. The consummation of this sale means untold prosperity and wealth to Shasta county.

Plumas.

CRESCENT.—*Greenville Bulletin*, Feb. 11: The Crescent mine is running in its usual quiet way with about 50 men on the payroll, and from the amount of wood coming in it will continue to run for some time to come, which means prosperity for this pleasant little town.

Sierra.

AROUND SIERRA CITY.—*Mountain Messenger*, Feb. 14: The Sierra Buttes M. Co. has leased a portion of the water of Packer Lake to Mr. Berger, to be used in running his 10-stamp quartz-mill. The Young America mill has been shut down for a month for repairs, on account of some of the shafting needing straightening. The above mill has been running almost continuously for more than five years. R. Forbes still has a force of men at work on his new race and wheel-pit. When the wheel is in place, he will have much more power than before. The Sierra Buttes Co. have ordered lumber for rebuilding the mill at No. 7 tunnel and repairing their flume, preparatory for resumption of work in the spring. Sinking has been resumed at the Thistle shaft, down, at latest advices, 434 feet. It is expected that the shaft will now be put down to bedrock without difficulty. A. C. Busch will soon erect a 10-stamp mill at the Phoenix ledge, above Sierra City.

GRAVEL.—The owners of the Telegraph Mining Claim, of Fir Cap, are raising a shaft expecting to find pay gravel. They think the old Fir Cap channel passed over the ledge upon which they have been running, at about the point they have now reached. If they can find the old channel they will find it very rich, no doubt. The quartz in which they have run for many feet is very fair milling rock.

Siskiyou.

PROSPECTING.—*Yreka Journal*, Feb. 10: Frank H. Hall, consulting engineer and mining expert of San Francisco, is now in our county prospecting an old river channel north of Etna, which he has traced from Callahan's at the head of Scott valley, clear down to the canyon of Scott river, and thence to Scott bar, a distance of at least 40 miles. This channel is believed to average 300 feet in width and is probably 100 feet deep, extending along the west side of the valley and close by the town of Etna, through the Quartz Valley, Oro Fino, Pinery and Mugginsville districts, the present prospecting operations being carried on near Mugginsville. It is believed that the prospecting now in progress will be the certain existence of this channel, to create a boom in Siskiyou mining never before excelled in any section of the Golden West. Mr. Hall has also been prospecting to some extent in the Salmon river section, and believes there is a grand future for Siskiyou in quartz and placer mining, and that the richest gold deposits are deeper down than any mining yet carried on in the county. Lee, Lash & Co., having completed a drain to the pump shaft sunk deeper down, at their blue gravel claim on Greenhorn creek, about a mile south of Yreka, are now working a large force, realizing about \$16 a day to the hand. They have an immense body of blue gravel varying from one to six feet in depth, with bedrock pitching westward under a hill, indicating that the hill is a slide into the old channel from the high range of mountains which extend from the Siskiyou range at the Oregon boundary throughout this entire neighborhood to Salmon river on our southern border, and to the New river district in Trinity county.

NEVADA.

Washoe District.

YELLOW JACKET.—*Virginia Enterprise*, Feb. 14: Shipping 45 tons daily of ore worth \$19 a ton, as per battery samples. East crosscut No. 1 on the 800 level is in six feet in fair grade ore. East crosscut No. 2, same level, has not yet reached the vein.

SEC. BELCHER.—The 600 level, south drift, has been extended to the south line; total distance, 164 feet. Have started an east crosscut from near the south line, which is out 16 feet; face in soft porphyry.

KENTUCK.—Have completed the airway in the raise on the 1000 level, east ledge, and advanced the raise 7 feet. It is now up 21 feet above the track floor. The top is in low-grade quartz, with stringers of pay in it. The 1000 raise in the west ledge was connected with the bottom of the 950 winze. The north drift on this level in the west ledge is advanced 11 feet, and is out 25 feet from the main east crosscut. The face is in low-grade quartz containing spots of ore.

JUSTICE.—The north drift, on the 822 level, is in 299 feet. The face is in hard rock. The south drift from No. 2 winze, 490 level, is out 125 feet. The face is in fair grade ore. Shipped to the mill during the week 116 tons 880 pounds of ore. Average battery assay \$18.50 per ton.

BELCHER.—The raise from the 200 south drift is up a total distance of 54 feet, having advanced 16 feet during the week. The top is in a mixture of clay, quartz and porphyry. Started No. 3 west crosscut from the south drift in the west ledge, 300-foot level, which is out to-day 40 feet. It has passed through and the face is still in a mixture of low-grade quartz and porphyry. The 1400 east crosscut is out 36 feet. The face is in porphyry and quartz giving low assays.

CON IMPERIAL.—The work of following up and taking out small streaks of ore on the upper levels and overhauling the old stopes of the mine is still being carried on.

CROWN POINT.—The west drift on the 500 level is out 42 feet. The face is in porphyry. Are making some necessary repairs on the 600 level and continue to extract a little ore from the 1300 stope.

OVERMAN.—Have extracted 352 tons of ore. Car samples average \$13.85. Shipped to Brunswick mill 380 tons of ore; battery samples average \$15.77 per ton. On the 1200 level, upraise on north-east drift has been extended 18 feet through quartz. Total length, 52 feet.

CONFIDENCE-CHALLENGE.—The north drift on the 300 level is in 181 feet, 9 feet having been made during the week. The face shows quartz having no value. This drift is 50 feet in Confidence ground. The joint Confidence and Challenge raise from the 750 level is up 163 feet, having been advanced 9 feet during the week. The top shows quartz having no value. The joint Challenge and Confidence west crosscut from the north drift on the 1100 level, is out 155 feet. The face shows quartz having no value.

HALE & NORCROSS.—On the 800 level the east crosscut started opposite west crosscut on our north boundary is advanced 45 feet; face in quartz carrying seams of low-grade ore. On the 1100 level the east crosscut on our north boundary line was advanced 30 feet; total, 190 feet; this crosscut is passing through a solid body of quartz of a grade too low to pay. No. 2 west crosscut started from the south lateral drift 55 feet south from the 1400 station is extended 60 feet; 80 feet north from No. 1 west crosscut on this level we have started No. 3 west crosscut and extended it 20 feet; face in quartz carrying bunches of fair-grade ore. No. 2 east crosscut started 60 feet north of the 1400 station is extended 85 feet; 25 feet made during the week. Eighty feet north of this crosscut we have started No. 3 east crosscut, which is advanced 20 feet.

SAVAGE.—During the week we have hoisted 610 carloads of ore from the 400, 500, 750 and 1300 levels and from the winze below the 1300 level. Milled 610 tons of ore, the average battery assay of which was \$14.60 a ton; bullion on hand on February account, \$6824. The north upraise from the 300 level is carried up 95 feet; top in low-grade ore. On the 400 level the intermediate east drift was extended 32 feet; total, 72 feet. This drift discloses nothing yet of practical value.

CHOLLAR.—Winze 80 feet south of north line, 750 level, is down 71 feet, bottom in clay and quartz. The east drift from the incline station, 1400 level, is out 30 feet; face in porphyry. Sent to the mill the past week 544 tons of ore worth \$19.02 a ton as per battery assays.

POTOSI.—No work was done in the winze the past week. The east crosscut south of incline, 1230 level, is out 130 feet; face in porphyry. South lateral drift from Chollar incline, 1300 level, is out 636 feet; face in porphyry.

EXCHEQUER.—East crosscut near the south line, 600 level, is out 304 feet; face in porphyry and clay. East crosscut on the north line, 600 level, is out 87 feet; face in hard porphyry and clay.

ALPHA.—South drift from crosscut east of shaft, 600 level, is out 51 feet; face in quartz, yielding fair assays.

UTAH.—On the 725 level the northwest lateral drift from the main west drift from the shaft has been extended 14 feet; total length, 418 feet. Near the face of this drift, or 150 feet northwesterly from west crosscut No. 1, west crosscut No. 2 has been started and advanced 36 feet in a porphyry and clay formation.

OCCIDENTAL.—During the week the whole force has been engaged in repairing and retimbering the main tunnel on the 550 level, which is about completed, and prospecting at several new points will be commenced during the coming week.

ANDES.—East crosscut from south drift on 420 level was advanced 18 feet; face in clay and porphyry.

Hawthorne District.

PANLICO ITEMS.—*Walker Lake Bulletin*, Feb. 11: A correspondent writes as follows from Hawthorne District: A rich strike was made in the Western Belle mine, owned by Hank Taylor and Joe Gilman, on the 6th of February. The discovery was made on the 6th day of this month by Hank Taylor. Col. Curtis is superintending operations. The ledge is two feet wide and averages \$100. The Lapanta, the best mine in the district, is looking well. J. Warner has lately taken a lease, and his prospects of making a stake are good. Other mines here are looking well. The lessees of the Gravel mine are in high spirits, and say they will come out all right in the spring. Rattlesnake John (better known as High Water O'Brien) owns the Moonshine. He says the gold is very coarse and a good ways apart. He is sinking and expects pay when he strikes the water level. The Mountain King is being worked by C. Blair and Badger Bill, and the prospects are good. The Pamlico lessees are making a living, and the lessees of the Striker mine have no growl coming.

Pioche District.

DRAFTED.—*Pioche Record*, Feb. 14: The mining company drafted a number of men at their outside mines this week. At the Half Moon 13 men were laid off, and about half the force at the Mendha. The anticipated closing down of the furnace is supposed to account for the action.

ARIZONA.

TO START.—*Prescott Courier*, Feb. 13: The company that recently purchased the Catocin from its old owners have given orders for work to start right away. Paul Johns, one of our best men and miners, will be in charge. Teams with tools, provisions, etc., are en route to the mine, which is in Hassayampa district, some 14 miles southwest from Prescott.

GOLD.—John Hartin of this town is a well-pleased individual. A short time ago he and J. J. Fisher, member of the House from this county, became possessed of small gold-bearing croppings, near D. Walker's, about seven miles west of Prescott. They commenced sinking upon the small development, which has kept growing, as it were, until it is over seven feet thick, at a depth of 35 feet. The ore is rich in gold; Hartin says it is free milling. The entire ledge has sampled about \$20 in gold to the ton. Some pieces of ore show a great deal of gold. A sample of the richest proved that it would mill over \$200 a ton. The owners are among our best citizens, and it affords the *Courier* pleasure to say that while they are not "stuck up," they feel their gold, not their oats. Wm. Ronald returned home recently from Eureka district. He examined

the Hillside, Parnell, and other veins, and thinks well of them. He likes the section so well that he intends settling on it. Miners of Castle Creek and Tip Top are taking out ore with their usual vim.

TIP TOP.—Cor. Arizona Journal-Miner, Feb. 17: Placer mines on Lower Humboldt have lain idle all winter for want of water. Henry Wager is working on the Basin mine, near the Old Silver Museum, 1½ miles east of Tip Top postoffice. Quite a force of men is at work building a good road into Upper Tip Top, to afford facilities for the increasing chloriding work in that locality. Humboldt, at Furley's camp, contains plenty of water for power or any other ordinary purpose, and more men are at work here than usual. Messrs. Sinclair, Yokum, Thompson, Champie, Farley and Kay, besides a half dozen strangers, are taking out what seems to be fine chloriding ore, running from \$25 to \$400 per ton. Ten teams went north over the New Bradshaw road last Sunday to bring concentrates from the Crowned King. This is about the first regular introduction to business since the road was completed.

BRITISH COLUMBIA.

THE LAKE COUNTRY.—Nelson Miner, Feb. 7: The people of Kootenay Lake country should have no hesitancy in inviting outside capitalists, miners and business men to take a hand in developing the resources of its several districts. Mining cannot successfully be carried on in British Columbia without reduction works, and reduction works without the production of fuel; neither can be carried on without timber, much of it manufactured. Along with reduction works and sawmills and boiling works will come foundries and machine shops, possibly not extensive plants but large enough to give employment to a hundred or so skilled and unskilled workmen. Have we the foundation on which to uphold these industries? The question can now have but one answer. The Blue Bell at Hendryx is pronounced a mine by thoroughly competent mining men; the surface indications of mines in Hot Springs district cannot be disputed; the fact that thousands of tons of ore are exposed in Toad Mountain district is the best evidence that can be presented as to its merits; that Goat River has claims that prospect well has been demonstrated by actual work; and, although not in the Lake country, Trail Creek district promises to be second in importance to but few in the province. Additional evidence is the fact that the country has produced and shipped ore and gold dust and bullion in the aggregate a sum equal to the sum expended in ore extraction and development work.

PROSPECTING ON THE NORTH SIDE OF THE KOOTENAY.—A party left Nelson to-day for the head of Grohman creek, to prospect the large ledges that are there exposed. The formation is granite, the ledge matter quartz carrying galena. The district is on the north side of the Kootenay, and not more than four miles distant from Nelson.

COLORADO.

SAMPSON.—Silverton Miner, Feb. 6: The Sampson, we learn, is about to pass into the hands of a Welsh syndicate now in process of organization under the direction of Chas. E. Jones and L. W. Morgan. This is the most gratifying piece of news we have heard this winter, and if the gentlemen mean business there is a bright season in prospect for Cement creek. The Sampson in operation means hundreds of prospects being worked by prospectors and the uncovering of more new mines. The Sampson is a large gold-bearing vein of mammoth proportions. Being opened for hundreds of feet in the way of lateral drifts along the vein, showing vast bodies of free-milling quartz, the mine is in shape to employ 100 men, and hardly a limit can be placed on the output. Being fitted with a powerful wire rope tramway which works on the gravity system, the ore can be delivered automatically under the stamps in the company's mill at a cost not to exceed 25 cents per ton. The capacity of the tramway is 150 tons and the capacity of the mill—25 stamps of 850 pounds each—75 to 100 tons daily. The lowest grade ore that ever went through this mill averaged \$11 per ton, while the average of the whole product is in excess of \$18 per ton. With such a layout as this we do not see what is to prevent this mine from becoming a profitable investment, unless it should be afflicted with incompetent management.

CHAMBER.—Preparations were made this week to cut out the large chamber in the North Star crosscut, which is to be used as a machinery room for the big shaft which is to be sunk this year. The machinery is to consist of a large hoisting and pumping plant driven by two large dynamos of 100 horsepower, the electricity to be generated by Pelton wheels at the mouth of the tunnel. The chamber will be 50x30 feet, 35 feet over the shaft and sloping off to 15 feet at the low end. The excavation will be done by contract and the cavity substantially timbered. The chamber will be nearly 2400 feet from the mouth of the crosscut.

THE IOWA.—Aspen Times, Feb. 11: The Continental Divide Mining Investment Co. has taken an 800-foot contract of the Iowa and Smuggler Mountain Mining Co. to do 800 feet of work on the Iowa mine. Some of the work will be done by drifting from the Bushwacker workings and the balance will be done in the old workings of the Iowa.

THE HIGHLAND CHIEF CO.—This is a new mining company and is the owner of the Pyramid lode claim located nearly a mile south of the Little Annie mine on the main blue and short line contact. The company also owns a portion of the Highland Chief lode and has an 18-months lease and option on the Matchless and Lackawanna Boy claims. Pay ore was found in the grass roots over the Highland Chief, but it proved to be a slop-ore from the apex and lodged in the blue lime. A shaft was sunk into solid blue lime, then a drift run east to catch the contact next to the dolomite. George Besser, who is the foreman for the company, thinks that he now has the vein in place, and expects to be shipping ore in a short time by sinking.

THE WILMINGTON.—Wheeler and Nugent, who have been running a tunnel from west to east on the Climax group, have gone through the porphyry and 50 feet of fine blue lime and cut into dolomite. There was found to be no mineral in the contact; drifting has been started to see if it will open into an ore chute. Some people are of the opinion that the dolomite encountered is only a narrow band and

that there is more blue lime and the main ore contact is east. The projectors of this enterprise are somewhat weary.

DAKOTA.

CARBONATE.—Deadwood Pioneer, Feb. 12: At the Iron Hill some very rich sulphurets have been struck in one of the exploring drifts, a chunk of which we were shown is very fine and easy enough seen to be the pure metal. It is said that they have several large ore bodies of both smelting and dry ore already explored, and the approximate amount which they have in sight gives them enough mixed with the ores of their other mines to run the reduction plant almost indefinitely. This company is in the business for making money, and will compete for the custom ores of the country. When needed, other stacks, or even a chlorination plant, will be added to the 20-stamp silver mill. The Albe is working four men, and has been taking out some very fine chloride of silver ore, of which we were shown some very fine specimens on their ore dump. They are timbering the lower part of the shaft. When this is finished, the work of extracting ore will commence and prospecting will also be continued. The Transit is looking immense. The ore is what is called dry, and is located in the shales, lies nearly flat with a dip of about ten degrees toward the northwest. The ore body is exposed for a distance of 75 feet by several open cuts, and varies from four feet to eight feet thickness in the thickest part. The Red Rock still continues to look well, and the owners are piling ore on the dump. The U. S. Grant folks are getting out a lot of good ore on their property.

LITTLE ELLEN.—Work on this property is progressing, and some fine pink and blue quartz has been encountered.

WHO-HA.—The Who-Ha mine at Ruby Basin now shows an excellent body of ore, and developments on it only serve to increase the body. The claim is owned by George Hopkins and Dr. Collins.

LOWER CALIFORNIA.

ALAMO.—Lower Californian, Feb. 12: The hoisting works of the San David are almost completed. The big hoisting engine at the Telemaco will be moved down on the San David soon. A large pump will be set at work then, as the location of the mine is favorable for catching all the waste water in camp not already caught by the Montezuma. Another great place for water is the section of the Gold Tree where Gastelum made his stake. It has been temporarily abandoned but it is too rich to lie idle long. This matter of too much water is a strong drawback to Alamo's rapid development. Kelley, late night boss at the Princess, has taken a contract to sink an additional 100 feet on the Ulises. He has a force of men at work. The Aurora mine and mill are working night and day and the ore is very rich. Sinking is steadily advancing, as well as drifting. The El Paso, Alamo and Scorpion mills are working. Among the mines being worked are the Aurora, Indio, Uhss, San David, El Paso, Gold Tree, Scorpion, Tarantula, Montezuma, Arabella, Gen. Torres, Van Tassel and Rattlesnake. Placing is going on in many places and Wescott and partners, in Mexican guile, have built a flume and are almost ready to hydraulic. J. B. Blethen is expected this week to settle the affairs of the Montezuma Co.

MONTANA.

MINES OF NEIHART.—Butte Miner, Feb. 16: Ed. Berge and Gus Damm are rejoicing over one of the best strikes made on Carpenter creek for many a long day, says the Helena Herald. In their Flansburg lode at a depth of 72 feet, they started a drift, and in going about six feet encountered four feet of galena and carbonates. Fisher and Walley have struck a fine body of galena and sulphurets in their Raven lode on Snow lead. It is understood that Armstrong and Sticht are now in Barker fixing up the old smelter, preparatory to "blowing in" next week.

BONDED.—The Despatch mine, located just west of the Valley claim and south of the Star West, has been bonded by George and William Farlin to Eastern parties for \$50,000 in case the bond is taken up within six months, and \$75,000 provided it stands one year. Work on the property will be commenced at once under the supervision of J. H. Maloney of the firm of Cobban & Co. The parties who have bonded the Despatch are also figuring on the Valley claim, and no doubt both will be producing in time if there is anything there to be produced.

BALO MOUNTAIN DISTRICT.—Phillipsburg Mail, Feb. 11: About 20 miles in a southwesterly direction from Phillipsburg lies the above-named mining district. It is just inside the northern line of Silver Bow county, but owing to the contour of the country this is the only available outlet, although, of course, all locations must be recorded in Silver Bow county. The formation of the country is lime and porphyry, and the veins all take an easterly and westerly course and dip to the south. Frazier and Carpp have the best developed property in this section at present, and the names of their claims are the Monarch, Sun and Forest Pine, and there is no doubt but that if these claims were close to some organized district one or more large companies would be at work on them. Adjoining the above claims Henry Maloney & Co. have what from present developments would appear to be not only the best in the Bald Mountain country, but a first-class producing mine. A couple of carloads of high-grade ore have already been shipped from this claim, and the deepest shaft is only a little over 80 feet, and some very rich specimens of gray copper ore are on exhibition in this city from it.

NEW MEXICO.

COOK'S PEAK ITEMS.—Southwest Sentinel, Feb. 14: The El Paso Smelting Co. is now working three claims—the Monte Cristo, Otobello and Desdemona. In driving a tunnel a large cave was struck, which has been explored for a length of 75 feet. It is from 30 to 40 feet wide. A very large quantity of fine ore has been found in it. A sample of 25 pounds has been tested and gave returns of 50 per cent lead. The tunnel is being driven ahead over the cave. Cook & Paynter have been jigging, and will soon have several cars of concentrates to ship. Tell & Poe are shipping regularly at the rate of about four carloads a week. J. A. Hinton has just

let a contract for 150 feet of work on his Georgetown mining property, and has also given a lease on part of it.

LONE MOUNTAIN.—Silver City Enterprise, Feb. 12: The Good Luck mine, belonging to Brockman & Beall, has within the past week assumed a new appearance. The walls have become regular and even, and the trend and dip in the vicinity of the ore-chute first discovered have become more definite. The body of first class ore now in sight is fully three feet in width and assays more than \$200 per ton average value. Alongside this is a large body of lower-grade ore which can be milled at a profit on the ground.

PIÑOS ALTOS.—At the Alpha and Omega, better known as the Huson and Thomas mines, the lessees, Professors Carrera and Doheny, have uncovered bodies of ore of greater magnitude than ever found so near the surface in any of the great mining districts of Colorado. The ore averages over 20 ounces per ton in silver and \$2 to \$4 per ton in gold, with 12 to 16 per cent lead. There is now on the dump at the mine 1000 tons of ore. Before the smelter combination went into effect, the ore was returning from \$250 to \$400 per car profit, but the raise in smelting charges has been so great, and present prices of smelting so exorbitant, that the owners and lessees are now considering the feasibility of starting a smelter at Silver City.

MORE STAMPS.—Silver City Enterprise, Feb. 12: The Mountain Key M. Co. have about completed the erection of an additional five stamps in their mill, which gives them a 15-stamp mill. This was rendered necessary by the accumulation of ore reserves in the mine. While development work has been extensively engaged in, the 10-stamp mill has been unable to reduce the ore in reserve in the slopes. With 50 per cent increase in milling facilities a large increase in production and net profits will be the result. Regular dividends may now be looked for. The new stamps will probably be started next week.

ALHAMBRA CAMP.—There is a rumor, probably well founded, that the Black Hawk mine will be worked with a full force of men as in days of old. This is one of the mines of Grant county which has contributed great quantities of native silver to swell the output of the precious metal. The Alhambra mine in the camp of the same name is "in bonanza." The new shaft is still in the rich ore chute encountered months ago, and is paying a handsome profit over and above cost of sinking. This is something that but few mines do, to pay a profit on development work.

OREGON.

THE BAILEY-ELKHORN.—Bedrock Democrat, Feb. 9: A smile will beam over the countenances of the Portland stockholders of the Bailey-Elkhorn Mining Co., operating in Baker county, when the January output of gold bullion is received by them at the head office, and they will be more than ever convinced of the necessity of a large reduction plant on their property. Yesterday there arrived at the First National Bank, of this city, the January output of the Bailey-Elkhorn mine, \$75,000, or two gold bricks weighing 79 pounds, the result of two Huntington mills. The output will be expressed at once to the U. S. mint for coinage. Mr. Oliver, superintendent of the company, when in this city a few days ago, made a guess that \$12,000 would be the amount for January, and its being exceeded by \$3000 is a matter of no little gratification. With a dozen or more mines in Baker county yielding as handsomely as the Bailey-Elkhorn there would be prosperity on every hand and dull times would be something unheard of. But that time will come just as soon as practical miners take hold of the hundreds of promising mines in this section. There has been altogether too much talk and too little work.

UTAH.

SILVER REEF.—Salt Lake Tribune, Feb. 11: Knowing that Mr. Judd was interested in mining in Silver Reef, the reporter asked regarding that old silver-sandstone district. He says the prospects are brighter at Silver Reef than they have been for many years. In the old Stormy King mine, owned by the Christy Co., the developments have been extending northward from the new shaft into new country, and it now shows up as well as it ever did in that property. Woolley, Lund & Judd have been running the Barbee & Walker mill in which they worked 1000 tons of ore averaging about 18 ounces silver to the ton. They have also been running the Christy mill part of the time. The ores crushed were raised by chlorides, who have been doing well, in fact, as well as ever miners did in that camp. About 40 miners are working in the district. Mr. Judd is of the opinion if the mines there, now belonging to three companies, were thrown into a corporation, that mining could be carried on to large extent, to good profit, and that Silver Reef would become a better district than it ever has been.

STRIKE AT STEWART NO. 2.—Out at the Stewart No. 2, Bingham, a strike was made two or three days ago on ore that assays about \$700 in gold, and this rich chute is eight feet wide. It is honeycombed quartz and located about 400 feet below the surface.

THE GIPSY BLAIR.—Cheering news comes from the Gipsy Blair mine at the head of Big Cottonwood. Late developments are bringing out the property. The shaft is down 100 feet, from which a drift at the bottom has been run 70 feet and this has cut a chute of ore 16 inches wide, which runs very high in silver. Previous assays of ore from other places on the vein ran from 200 to nearly 500 ounces, but ore from the late strike has not been assayed, although it looks as if it will run well in metal. Five persons are employed this winter on development work, and it is proposed to put on a large force in the spring. The late strike pleased Mrs. Vandebarker so well that she organized a party, consisting of herself, Wm. Wedlake and Robert Knows, to come down and bring the news. They put on their snowshoes on Tuesday and boldly pushed out over the snow, which is about 15 feet deep at the head of the canyon, but gets thinner all the way down. At one place their movements started a slide, but they were not caught in it. At other places they glided over the snow where there were big cracks, and had to move with caution to prevent starting slides, and at one time the lady lost one of her snowshoes and it was recovered with difficulty. But they reached this city in safety yesterday, well tired out from their perilous journey down the canyon.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING FEB. 10, 1891.

445,376.—DIVIDER ATTACHMENT FOR MOWERS Mark Anthony, S. F.
445,221.—CABLE RAILWAY—L. M. Clement, Oakland, Cal.
445,249.—CHAIR—Julia W. Craig, S. F.
445,227.—STREET-CAR FENDER AND BRAKE—Geo. T. Hall, Moravia, Cal.
445,350.—LENSES FOR ILLUMINATING TILES—P. H. Jackson, S. F.
445,352.—BORING MACHINE—A. M. Jewell, S. F.
445,353.—BORING MACHINE—A. M. Jewell, S. F.
445,234.—THRASHING MACHINE—E. McDonald, Willows, Cal.
445,351.—BRAKE FOR CABLE CARS—J. F. Waite, S. F.
445,240.—CAR COUPLING—G. W. Weller, Baker City, Or.
445,275.—AIR-SIGNALING APPARATUS—G. B. Williams, Portland, Or.

The following brief list by telegraph, for Feb. 13, will appear more complete on receipt of mail advices:

California—George B. Baer, Cloverdale, mailing machine; Stephen S. Black, assignor of one-half to E. A. Cochran, Pasadena, skate; William H. Burns, Los Angeles, carbon for electric lamps; William M. Craig, Santa Ynez, windmill; Edwin Deponore, Coronado, veneer cutting machine; Joseph W. Fawkes, Sr., and J. W. Fawkes, Jr., Burbank, card-exhibiting device; Richard E. Jeffery, Grass Valley, vehicle wheel; Larena A. Johnson, San Francisco, fish net; William A. Judge, Santa Barbara, index; Ezra W. Keeler, San Francisco, panoramic device; Elizabeth T. Mabi, Alhambra, apparatus for delivering clay to sewer-pipe presses; Andrew G. Phillips, San Francisco, a feed; William T. Y. Schenck, San Francisco, hose reel; Stanley B. Whiteside, San Francisco, mailing machine; Henry N. Williams, San Francisco, compound for paving, roofing and building purposes; William Wright, New York, assignor to Wright's Denver and San Francisco Electric Light Company of Colorado, battery compound.

Oregon—Lizzie Graham, Portland, floor-washing machine; John H. Krouse, Portland, wiring attachment for baling presses; John B. Walker, Corvallis, railway joint.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ADJUSTABLE LETTERING DEVICE.—Lewis A. Gates, S. F., assignor of one-half to Henry J. Postel, Sacramento. No. 445,750. Dated Feb. 3, 1891. This "adjustable lettering device" consists of a framework having a series of horizontal parallel wires, and in connection therewith of letters, figures or characters having flexible extensions or spurs, which are bent over so as to engage the wires and hold the letters or characters at any desired point. The letters may be placed upon the wires at any desired point so as to form signs or other advertising or ornamental work. They are easily removed by simply compressing the wires upon which any letter is hooked toward each other, when they may be unhooked and taken off, and their positions changed or other letters substituted. By this construction and style of letter any change of sign may be had, the frames being always useful for any sign that it may be desired to make.

FRUIT-FITTING MACHINE.—James T. Ish, S. F. No. 445,753. Dated Feb. 3, 1891. The object of this invention is to provide a machine of this class in which both the flesh of the fruit and its pit are cut through and the latter removed. The fruit is placed in spring holders of an arm which, swinging upwardly, delivers it between traveling opposing cups, the cushion-holders of which retain it. The fruit is then brought into contact with the stationary knife, and a revolving knife coming up behind it at that instant, both the flesh and the pit are cut into halves. These pass on each side of and in contact with a directing plate and curve around its end branches. Then when opposite the nippers, their peculiar action extracts the severed pits.

BRAKE FOR CABLE CARS.—James F. Waite, S. F., assignor of one-half to Wm. Hollis. No. 445,305. Dated Feb. 10, 1891. The object of this invention is to provide a simple and effective brake, of that class in which the slot irons are acted upon as a frictional resistance or contact. The invention consists in the novel brake and means for hanging and operating it.

LENSES FOR ILLUMINATING TILES.—Peter H. Jackson, S. F. No. 445,350. Dated Feb. 10, 1891. This invention relates to the class of lenses to be used in cement, concrete, or other plastic material, when applied to illuminating tiles for sidewalks, floors, roofs and the like, for illuminating apartments beneath. The invention consists in the novel lens and in said lens in connection with the surrounding material in which it is imbedded.

BORING MACHINE.—Ammi M. Jewell, S. F. No. 445,352. Dated Feb. 10, 1891. This invention relates to the general class of boring machines, and particularly to a machine for boring the stiles of doors, blinds and sashes. The object is to provide a suitable machine for boring holes in such stiles, whereby they are adapted to receive dowel pins, which are also let into holes in the rails of the doors, blinds and sashes, whereby these articles are put together by dowels instead of mortises and tenons.

BORING MACHINE.—Ammi M. Jewell, S. F. No. 445,353. Dated Feb. 10, 1891. This is a machine for boring the holes in both ends of the rails of doors, blinds and sashes to receive dowel pins, whereby said rails are connected with the stiles instead of by the usual mortises and tenons.

MECHANICAL PROGRESS

Abrasive Cutting.

At a recent meeting of the Technical Society of the Pacific Coast, the principal feature of the evening was an essay on the subject of "Abrasive Cutting in the Mechanical Arts," written by John Richards, and, in his absence, read by Otto von Geldern. The essay was in part as follows:

"Cutting is divided into two classes, direct and abrasive. The direct process is by means of edges, applicable to soft material, and abrasive applicable to hard material.

"Abrasive cutting is performed by means of wet stones, sand, emery, glass, corundum, crocus, rouge, and in some cases by soft iron alone. Chief among these methods is that of wet stones or common grindstones, which form a more important part of converting implements than is commonly supposed.

"The principal development of wet-stone grinding, that is, gage grinding, has been in the large saw and tool factories. I do not mean hand-grinding. That is simple enough, but gage grinding has been the subject of a great amount of ingenious effort by highly skilled mechanics, who have not carried their knowledge beyond the works where it was applied.

"There is not little dry grinding done in this country, and so far as known only on stones brought here from England. It may have been noticed that the shafts of tools brought from England, chisels for example, are ground crosswise and are very rough. This is done on small stones driven at high speed, called 'shank stones.'

"Abrasive cutting by heat consists in applying smooth disks of steel or iron, driven at high speed, to pieces to be cut; the heat developed by friction being sufficient to melt the metal in contact with the wheel, or, what is more probable, softening it to a plastic state, so it is rubbed away by the wheel.

"Grinding is a process of accuracy. In metal working the operation of cutting has a limit of accuracy at 1-1000 part of an inch in coarse work, and 1-200 part of an inch in fine work. All accurate and all polished surfaces are finished by abrasive operation."

THE "COLD SAW" METHOD.—The *Iron Age* comments upon this as follows: That the general adoption of the "cold-saw" method of cutting metals will depend wholly and primarily upon the character of the machine introduced for doing the work, is a foregone conclusion. That this method, which in reality employs a thin milling cutter of comparatively large diameter, is well adapted to meet every requirement satisfactorily, is beyond dispute. The introduction of the machine and its displacement of the rapidly-revolving saw now used will depend upon two things—the method of mounting and of driving the saw. The controlling factors are identical with those governing the construction of the ordinary milling machine, of which this is only a modification. Rigidity is the first and most important requirement. There must be sufficient strength to prevent absolutely any yielding, since the smallest degree of elasticity would be fatal to good results. The driving gear should be correspondingly powerful. These qualities obtained, the adoption of the cold saw will follow speedily. The machine of this description possesses great advantages when compared with the one now employed. This is particularly apparent in the character of the work done by both. The old machine can only be used on rough work; the cold saw can be used for fitting where great accuracy is demanded, as in bridge and ship building establishments especially, and it is here that its vast superiority is most manifest. In addition, it requires less power to be operated, the wear and tear is much reduced, and these points, together with the greater accuracy mentioned, more than counterbalance its slower cutting speed. These tools are used somewhat extensively in England, and their adoption here depends, as mentioned, solely upon good design and construction.

A WONDERFUL ALLOY.—A copper aluminum alloy, says the *Engineer*, has lately been tested at Chalais, in the department of aerial navigation, with some surprising results. Nearly pure aluminum and ordinary copper conducting wire were alloyed and rolled into sheets 1 mm. thick, and from these, strips were cut 5 mm. wide. The results of the various percentages in the alloy on trial showed that the addition of only two per cent of copper increases the tensile strength of aluminum from about 37,000 to nearly 44,000 pounds per square inch, and the addition of six per cent of copper more than doubles this tensile strength. It will be also noted that an alloy can be made having double the strength of pure aluminum that is less than one-twentieth heavier than the pure metal. As the *Engineer* remarks, experiments on so small a scale are no guarantee that an alloy of equal qualities could be made on a commercial scale, and further experiment is necessary to the general behavior of this alloy; but it is interesting.

A NEW DYNAMITE GUN.—The United States Government has authorized a test at Fort Sheridan on a new gun 9½ feet long, which is said to be capable of throwing dynamite or other high explosive shells a distance of five miles

thousands of times in succession without becoming overheated. The inventor is Louis Gathmann of Chicago. The chief novel feature is the use of liquefied carbonic acid gas, delivered automatically along the entire length of the bore at the instant of discharge, not only as an absorbent of the heat generated, but as a "cooler" after the charge has left the gun. By another device, pneumatic pressure is produced with powder. Should the invention prove a success, Gathmann expects that the existing systems of coast defense would be revolutionized.

ALUMINUM STEEL ARMOR PLATES.—Some interesting experiments, says the *American Manufacturer*, are being made at the works of the Carbon Iron Co., in Pittsburgh, by which it is expected that the possibility of making armor plates of aluminum steel may be demonstrated. The fact that a small percentage of aluminum in steel increases its strength is well known, and with this in view, the experiments mentioned above have been undertaken. The company is now engaged on a government contract for armor plates, and by introducing about one-fourth of one per cent of aluminum into this steel, some satisfactory results have been obtained. An ultimate strength of 105,000 pounds has been reached, and the metal showed remarkable toughness and ductility. With an ordinary steel plate, when a tensile strength of about 100,000 pounds was obtained, the amount of carbon would necessarily be about three-quarters of one per cent, which would render the steel too brittle for armor. The high price of aluminum is the present drawback to its extensive use, but it is thought that by another year the price of a grade of aluminum pure enough for the purpose can be manufactured for less than a dollar a pound, which will place it more within the reach of steel-makers. The present experiments at the Carbon Iron Works will be continued for some time, until it is established whether the project is entirely feasible.

IMPROVED JOINTING OF IRON SURFACES.—It is found that a permanent and satisfactory joint can be effected between rough cast-iron surfaces by the use of mineral asbestos mixed with sufficient white lead to make a very stiff putty; this, it is ascertained, will resist any amount of heat, and is so unaffected by steam or water as to be serviceable for mending or closing cracks in cast-iron retorts employed in the distillation of oil and gas from canal coal. The heat being applied to the bottom of retorts and the temperature of the iron maintained at a bright-red heat, after a time the bottom of the retort would give way, the larger portion of the crack being downward toward the fire. The method employed was to prepare the mixture and place it on top of a brick, then put the brick on a bar of iron or a shovel, and press the cement upward to fill the crack in the iron, holding it up for some time until it had penetrated the cavity and become somewhat set, necessarily, during this operation, the lid being removed from the retort, so that no pressure of gas or oil should force the cement outward until set. The use of asbestos in this way possesses various advantages, not the least of which is that the substance cannot burn.

WATER METERS AND POWER METERS.—It was a long time before water meters became universal, but they got around at last, and how easy it is to tell when water is going to waste or a half-valve needs packing, and so with gas. The least leak about the building is shown at once in the meter, but with the power that is being supplied to a machine shop, nothing is ever done but to guess at it. This is a mistake, as a meter for this purpose is easily made by attaching a counter in the driving pulley that will record, not the number of times that the pulley revolves, but the amount of unbalanced force that the pulley has been subjected to at every turn. In the meter, the intensity of this driving strain governs the amount that the counter shall count at every revolution of the shaft, which must show like the meter for gas or water, where power is going to waste, or more is bought and paid for than has ever been used.—*Boston Jour. of Commerce*.

A CYLINDRICAL STEEL CAR.—The question of substituting iron for wood in car construction is constantly coming more and more to the front. So far only a few express and mail cars have been constructed of iron; but a company has recently been organized in Chicago for building steel cars, which bids fair to become a success. Such cars will be much stronger than wood, quite free from doubling up or splintering in a collision, and absolutely fireproof. They should come into general use.

THE RANGE and penetrating power of modern rifled guns is tremendous. The 10-inch rifle which the Miantonomah now carries at the Navy-Yard will pierce 21 inches of iron at a distance of 1000 yards. The 6-inch American rifle will drive its projectile through 10½ inches of wrought iron at 1000 yards. The 8-inch rifle will pierce 16.3 inches of iron at the same distance. The 12-inch rifle will penetrate 28 inches of iron at the same distance.

GOLD is very scintillating—that is, it can be cut and shaved with a knife, like a piece of wood or horn, while pyrites and other worthless minerals will crumble under the knife-blade like a lump of sugar.

SCIENTIFIC PROGRESS.

ORIGIN AND CAUSE OF THE GULF STREAM.—W. S. Howard, who was for three years on the United States Coast Survey steamer Blake, says that for two years the gulf stream was observed and traced, and it was definitely ascertained to originate at a place between Fowey Rocks, a ledge in the Atlantic, off the south extremity of Florida, and Gun Key, on the Bahama coast. The steamer was anchored at this point, and the study of the gulf stream was begun there. The stream was found to vary daily in velocity, the difference being equal to 2½ knots per hour. The current was affected by the moon, and the greatest strength of the current was a day or two after the declination of the moon. The steamer anchored at 26 stations to observe the gulf stream, and upward of 1500 observations were taken. With other apparatus two meters were used at once by which the velocity of the surface and the subsurface was simultaneously noted. The surface current runs with much greater velocity than the sub-surface. The true axis or beginning of the stream is 11½ miles east of Fowey Rocks Light-house. Here the strongest surface current found was 5½ knots per hour, and the weakest 3½, an average of 3.6 knots. At the axis there is a depth of 498 fathoms of water. The soundings brought to light no explanation of the mysterious origin of the stream. The deductions from the observations are that the trade winds and Mississippi river may both be dismissed as probable creators of the current, and that the velocity of the current is positively controlled by the declination of the moon.

THEORIES AT FAULT AS TO COAL COMPOSITION AND ACTION.—It is now asserted that the attempt that has been made by certain German chemists of prominence to connect the physical phenomenon of coking with the chemical composition of bituminous coal—especially with reference to the richness of the coal in what is called disposable hydrogen, or that proportion of it which is in excess of the quantity required to form water with the oxygen present—does not correspond with observed results, nor, again, does the richness of a sample of coke in carbon determine its coking qualities, the fact being that two specimens of coal, of practically identical carbon composition, are often found to behave very differently in the retorts of coke ovens. It is therefore argued that, if the property of coking does not reside either in the surplus hydrogen or the fixed carbon, it is certainly not to be found in the contents of the coal in oxygen, which gives no indication whatever of the physical behavior of the coal under heat. Some coking coals coke without much swelling, while others swell considerably in the process; in either case, the coal must undergo a stage of fusion, in which it becomes a thick, semi-fluid mass, through which the gas escapes; but why one kind of coal should swell considerably, while another variety of similar composition does not, is admitted to be a problem not apparently capable of solution from any of the chemical data usually preserved in analyses of coals.

THE RESEARCHES OF EMINENT BACTERIOLOGISTS and the discussions lately held regarding the causation and prevention of tuberculosis and other diseases have invested with profound interest the question of the relations of the diseases of lower animals to those of man. At the International Congress of Hygiene and Demography, to be held in London next August, a section will devote special attention to the infectious, contagious, parasitic and other diseases communicable from animals to man, and vice versa; the methods of the propagation of diseases affecting mankind by means of animals and animal products; the infection of meat, milk and other comestibles, and the restrictions to be placed on the sale of infected food and the movement of infected animals. A number of the high authorities in the medical, veterinary and agricultural world are expected to participate and throw light on investigations that are of great importance to the welfare of mankind.

FURTHER PROOF.—It has long been held that the diamond is identical with pure carbon. Further proof of this has recently been advanced by some experiments on the diamond by Mr. A. Krane, who burnt some splinters in a current of oxygen, the products of combustion being absorbed by ammonia, and the ammoniacal solution decomposed with pure sodium hydroxide. A comparison of the crystals obtained on evaporation with those of pure sodium carbonate showed that they had the same percentage of water of crystallization, and that they were identical in crystalline form, optical properties, melting point, electrical conductivity, and solubility in water. According to the *Journal of the Chemical Society*, the author concludes that the diamond must be chemically identical with carbon, since not only is the atomic weight the same, but on oxidation they both yield exactly the same product.

PAMBUANO, A SUBSTITUTE FOR QUININE.—Dujardin-Beaumetz has, according to the *Medical Press and Circular*, recently called attention to the antiperiodic properties of an extract obtained from the root of a shrub called pambuto. The aqueous decoction of the root has been largely and successfully used in

the treatment of malarial fevers; it has been beneficial in a number of cases in which the symptoms did not yield to quinine. The isolation of an alkaloid has not hitherto been effected, but the plant contains various fatty bodies and essential oils in addition to a special kind of tannin. All the active properties of the root are extracted by maceration in alcohol at 60°. The writer in the *Press and Circular* adds that, while the high value of quinine as a febrifuge and antiperiodic is incontestable, the faults and failures of the old favorite declare themselves from time to time, and hence the discovery of other vegetable products which have similar powers is not without importance, since some of these may and do succeed when quinine has proved ineffectual.

FROST-RESISTING POWER OF STONES.—Experiments on the frost-resisting power of natural and artificial building stones have been made by Mr. Sanechinger, as stated in the *Journal of the Society of Chemical Industry*, with 21 different kinds of natural building stones, three to six test pieces of each being used. Their tensile strength, dry and wet, their capacity for absorbing water, their alteration in volume, tensile strength and behavior toward water after freezing and thawing 25 times, and their specific gravity, were determined. Out of this number of samples, ranging from limestone to sandstone, only six were found to resist repeated freezing, viz., one of dolomite, one of diorite and four sandstones. Four other samples were found to resist freezing fairly, but not absolutely; but of 41 samples of artificial stones similarly tested, only three were found thoroughly unaffected, while eight proved fairly resistant.

THE TOXIC PRINCIPLE OF INSECT POWDER.—The active principle of pyrethrum flowers is said to be an acid (pyrethrotic acid) soluble in alcohol, amyl alcohol, ether, and chloroform, which may be isolated by means of ether, after having been converted into an alkaline salt and decomposed by tartaric acid in aqueous solution. When this acid was hypodermically injected into animals, it was observed that the poison produced its effects in two distinct stages. In the first there was an excitement more or less pronounced, proportional to the quantity administered; in the second there was a complete prostration, accompanied always by paralysis of the lower extremities, which might disappear after a time, or be the precursor of a fatal issue, the respiration and circulation being effected only in the latter case.

ANOTHER PHOTOGRAPHIC DISCOVERY.—According to the Vienna correspondent of the *Daily Chronicle*, an interesting discovery in photography is said to have been made by Herr Dombrzynski, of the Lamberg Polytechnic Academy, who claims to have succeeded in photographing by electro-magnetism. In a report on his discovery, addressed to the Vienna Academy of Science, Herr Dombrzynski explained the means by which he succeeded in obtaining photographic effects by electro-magnetic undulations.

AN ALLOY, the electrical resistance of which diminishes with increase of temperature, has recently been discovered by Edward Weston. It is composed of copper, manganese and nickel. Another alloy, due to the same investigator, the resistance of which is practically independent of the temperature, consists of 70 parts of copper combined with 30 of ferro-manganese.

SPEED OF SHOT AND METEORS.—The singular fact is demonstrated that, while the most rapid cannon shots scarcely attain a velocity of 600 meters a second—over 1500 miles per hour—meteorites are known to penetrate the air with a velocity of 40,000 or even 60,000 meters per second, a velocity which raises the air at once to a temperature of from 4000 to 6000 degrees C.

LATENT HEAT.—The phenomenon of latent heat was first inquired into by Dr. Black, of Scotland, nearly 130 years ago. His attention was directed to the subject by observing that a mixture of ice and water, though absorbing a measurable amount of heat, did not rise in temperature until all the ice had disappeared.

A STRETCHED PLATINUM WIRE, when heated to incandescence and traversed by an intermittent current of electricity, vibrates and becomes subdivided in a series of waves, having well-marked neutral segments and nodes.

BACTERIA AND PHOSPHORESCENCE.—A French savant has discovered that the phosphorescence in crustacea is owing to the presence of bacteria in the muscle—in other words, disease.

THE MOON.—Prof. E. S. Holden, of the Lick Observatory, has a paper on "The Moon" in the February double number of the *Youth's Companion*.

BEEES AND WASPS.—About 4500 species of wild bees are known, of wasps 1100, of which 170 and 16 respectively live in Great Britain.

In the six-inch rifled gun the projectile is making 250 revolutions per second at the moment of leaving the muzzle.

USEFUL INFORMATION.

The World's Money.

Mr. Leech, the Director of the Mint, has prepared for the House Committee on Coinage a series of interesting tables showing the gold and silver estimated, and officially reported to be in circulation as money throughout the world, and the specie holdings of the leading European banks. The most comprehensive table is the following:

APPROXIMATE AMOUNT OF GOLD AND SILVER MONEY IN THE WORLD.

Country.	Gold.	Silver.
United States.....	\$492,018,863	\$482,671,346
United Kingdom.....	550,000,000	1,000,000,000
France.....	100,000,000	700,000,000
Germany.....	600,000,000	145,000,000
Belgium.....	65,000,000	55,000,000
Italy.....	140,000,000	60,000,000
Switzerland.....	15,000,000	15,000,000
Greece.....	2,000,000	4,000,000
Spain.....	100,000,000	125,000,000
Portugal.....	40,000,000	10,000,000
Austria-Hungary.....	40,000,000	90,000,000
Netherlands.....	25,000,000	65,000,000
Scandinavian Union.....	82,000,000	10,000,000
Russia.....	100,000,000	60,000,000
Turkey.....	50,000,000	45,000,000
Australia.....	100,000,000	7,000,000
Egypt.....	100,000,000	15,000,000
Mexico.....	5,000,000	50,000,000
Central America.....	5,000,000	500,000
South America.....	45,000,000	25,000,000
Japan.....	90,000,000	50,000,000
India.....	900,000,000	70,000,000
China.....	700,000,000	100,000,000
The Straits.....	100,000,000	5,000,000
Canada.....	10,000,000	2,000,000
Cuba, Hayti, etc.....	20,000,000	2,000,000
Totals.....	\$3,727,018,863	\$3,820,671,346

The silver money is classified by Director Leech, in the following table, into that which is full legal tender and that which is tender for but limited amounts:

	Full legal tender.	Limited tender.
United Kingdom.....	\$100,000,000	\$100,000,000
France.....	\$650,000,000	50,000,000
Germany.....	102,000,000	43,000,000
Belgium.....	49,400,000	6,000,000
Italy.....	25,800,000	34,200,000
Switzerland.....	11,400,000	1,600,000
Greece.....	1,800,000	2,200,000
Spain.....	90,000,000	35,000,000
Portugal.....	40,000,000	10,000,000
Austria-Hungary.....	90,000,000	10,000,000
Netherlands.....	61,800,000	3,200,000
Scandinavian Union.....	10,000,000	10,000,000
Russia.....	22,000,000	38,000,000
Turkey.....	45,000,000	15,000,000
Australia.....	7,000,000	7,000,000
Egypt.....	50,000,000	50,000,000
Mexico.....	500,000	500,000
Central America.....	500,000	500,000
South America.....	25,000,000	25,000,000
Japan.....	50,000,000	50,000,000
India.....	1,000,000,000	1,000,000,000
China.....	700,000,000	700,000,000
The Straits.....	100,000,000	100,000,000
Canada.....	1,200,000	5,000,000
Cuba, Hayti, etc.....	1,200,000	5,000,000
Totals.....	\$3,929,900,000	\$408,000,000

The total stock of full legal tender silver coin in Europe is given at \$1,101,400,000.

THE UTILIZATION OF PINE LEAVES for the manufacture of bagging, matting, etc., has become an industry of recognized importance, and in North Carolina a company has for some time been in operation for thus producing matting and bagging, with a daily capacity of 2000 yards, the material being in every respect equal to jute, as well as cheaper. The process appears to be a simple one. The leaves of the long-leaf pine are gathered in a mass, and, on being weighed, are thrown into a large vat, whereby they are boiled in alkali at a low temperature for about 12 hours; then, after being thoroughly soaked in the same vats, they are taken by a continuous automatic process through the rubbing, wringing, carding, drying, re-carding, drawing, roving, winding and weighing machines, in the latter of which the substance becomes an excellent article of bagging, and, after going through a calendering apparatus, is ready for use and the market. After leaving the wringer, the process of manufacture is very nearly identical with that of cotton goods. As a material for upholstering purposes and for carpet lining, it is found well adapted. It appears that for every foot of pine timber there is one pound of green leaves; nor is the tree at all injured by this treatment. Though capable of being worked up successfully into the other fabrics above named, the principal use of the leaves thus far has been for the manufacture of bagging.—*American Economist.*

TO PREVENT the paint on iron or wood from scaling off when exposed to the weather, first thoroughly wash the parts to be painted and then brush over the surface with hot linseed oil. By following this method, especially with iron articles, no scaling of the paint will occur. In cases where the articles to be painted are small and can be readily heated, it is better to heat them and plunge them into the oil. The thin liquid oil when hot enters into the pores of the metal, absorbs the moisture, and the paint then applied so firmly adheres that frost, rain or air cannot effect a separation.—*Phila. Record.*

"AFRICAN BASS" is the name given to a fiber obtained in the colony of Lagos from the bamboo palm. In appearance it is stiff and wiry, varying in color from dark brown to light red, and dependent for its shades on duration of soaking. It is most readily obtained in lengths of from three to four feet, beyond which length it is inconvenient to pack

and difficult to procure without injury to the tree. In diameter it varies from one sixteenth to one-thirtieth of an inch, the latter of which may be accepted as the limit of fineness to be admitted in a commercial sample for the European market. It is said to be used mainly in the manufacture of hard brushes for various domestic and manufacturing purposes. The demand appears to be very large, and the price is exceedingly satisfactory. The source of its supply in Lagos alone may be said to be practically inexhaustible.

HOW TO DECIDE THE "ALL-WOOL" QUESTION.—A fire test for wool is recommended by the *Lancet*. After separating the warp from the wool, hold each to a flame. No threads can be traced in the ash of wool, which burns to a shapeless mass or coarsens to blazes if removed from the fire before combustion is complete. Cotton, however, continues to burn steadily, and the shape of the thread is retained in the ash. Try it.

TYPE-SETTING MACHINES.—It is estimated that \$10,000,000 has been spent in the last 20 years on inventions for new type-setting machines, and the prediction is made by many that it is now only a question of a short time when, for ordinary and straightforward work, the machines will be in general use.

ENGLAND'S BEEF SUPPLY.—England is more dependent every year on imports of beef from the United States. More than three-fifths of the 500,000 cattle imported annually come from this country, the remainder from Canada.

ELECTRICITY.

AN ELECTRIC-POWER HAMMER has been devised which represents a radically new application of electro-magnetic principles. In general design the hammer is quite similar to the steam hammer, with its vertical cylinder mounted upon an arched frame, and the rising and falling piston by which the hammer-head is carried. The novelty of the apparatus lies in the substitution of electro-magnetic power for steam by a slight and very simple modification of the mechanism. The piston is of magnetic material, and the cylinder is composed of a series of coils through each of which an electric current may be passed separately. The apparatus is virtually an immense electro-magnet, the cylinder being the coil and the piston answering to the core. The passage of an electric current through the coils forming the upper part of the cylinder, raises the piston into the magnetic field thus created. By cutting off the current and simultaneously transferring it to the lower coils of the cylinder, the piston is released and its descent is accelerated by the magnetic attraction created below. As a magnetic field can be created in any of the series of coils, the blow may readily be shortened or lengthened as desired. The current is controlled by levers and connections identical with those used on an ordinary steam hammer. The absence of the steam pipe is the only feature distinguishing the machine from the common steam hammer.

ELECTRICAL ENGINEERING.—The inducements offered by the profession of electrical engineering are drawing each year an increasing number of young men into technical study of the subject. Electrical industry has two widely different phases, practical and technical. Fifteen years ago so little was known of the practical application of electricity that a quick, inventive mind, with no more technical training than might be gained by the experience of a telegraph office, could strike out in new lines of progress with every prospect of success. To-day good work cannot be done without studying and profiting by the results of that 15 years of marvelous development. He who starts to-day with the training that would have meant success then, will probably meet dismal failure now. Therefore, in taking up the study of electrical engineering, the more careful and thorough work you do, the better the chance in the future. Do not be deluded into the idea that you should "learn practical electricity in the workshop." You can learn more that will be of service to you by a year's careful work in a good laboratory than in five years in an electrical manufactory. Do not expect to leave the laboratory with an intimate knowledge of any electrical system; you will not have it, but you will have acquired what is of vastly greater value, that firm grasp of the general principles that will enable you to seize the details of any system with a rapidity that will surprise you.

THE ELECTRICAL TOOTH DRAWER.—The electrical instrument invented for avoiding the pain incident to the extraction of teeth consists of adjustable prongs, carrying buttons and connected with an electrical battery. The buttons are placed on the face, over the nerves leading from the teeth to the brain, and a circuit is established the moment the extracting instrument touches the tooth.

WELDING SHEETS BY ELECTRICITY.—C. L. Coffin of Detroit has patented a device for welding sheets by electricity. The two sheets of metal to be welded are placed on a suitable insulated table with the edges to be welded opposite each other, and are so clamped by means of two clamps, to each of which one pole of the dynamo or electric generator is connected. A cur-

rent thus passes through the plates and their opposite edges become heated. This heat is, however, intensified by a roller being rolled along these edges, which is also connected to one of the poles of the generator, so shunting part of the current. In order that the heat shall be still more intensified, the roller can be so constructed that it can be continually slightly withdrawn from the plates to be welded and then brought in contact again, thus forming a voltaic arc.

ENGINEERING NOTES.

Railroads in South America.

The Trans-Andine railway, which was undertaken a good many years ago, will probably be completed next year, forming the first railway across the continent of South America. Of the entire distance of 871 miles from Buenos Ayres on the Atlantic to Valparaiso on the Pacific Coast, only about 100 miles remain to be constructed, but this is the most formidable portion, crossing the Andes at an elevation of 13,000 feet above the level of the sea and involving heavy grades and long tunnels.

This road, through much of its course, passes over a very level and fertile country, and has what is probably the longest straight line of track in the world. Over this part of the track the locomotive runs, without a curve, 211 miles. Moreover, in this distance there is not a single bridge and no opening larger than an ordinary culvert, no cut greater than one meter in depth, and no fill of a height exceeding one meter. There is almost an entire absence of wood on the plain across which the western end of the road is located. This has led to the extensive use of metallic ties, which will be employed on nearly the entire road.

Railroad building in South America seems to have taken a new impetus during the last few years, which will no doubt be much increased by the deliberations of the Pan-American Congress.

NAVAL ENGINEERING.—G. Pinnlington, C. E., of Chester, England, says *Industry*, has been writing some interesting essays on the dynamics of ship propulsion, and has had the temerity to make his propositions understandable by people not skilled in complex formulae. It is often asked why the force required to part the water at a ship's bow is not given back by the rudder on or reflex at her stern. This, as Mr. Pinnlington explains, in simple terms, is because the ship is moving ahead. Supposing the resistance to movement to be equal to a head of 16 feet, a velocity of 32 feet per second, then reflux action would not do any good when flowing ahead at this rate. From this it follows that the form of a ship's stern should be modified to suit her speed. Again *Industry* asks: If passenger ships progress from 10,000 to 20,000 horse power in four years, what will take place in the future? The City of Paris, City of New York, Tonleuc and Majestic range from 17,000 to 20,000 horse power and burn from 300 to 400 tons of coal a day, or about one ton per mile. One reflection in this matter is that if development go on at this rate it will plant more firmly than ever the steamship-building interest in Great Britain. There is no stopping place, it seems. The art is cumulative, and the start gained there gives the industry an enormous advantage. Some one has been dividing the tons and horse-power of war vessels into their cost, and finds that in England it is \$150 per ton and the same per horse-power. In France it is \$232 per ton and \$280 per horse-power. In Russia the cost per ton is \$436, and in this country \$335 per horse-power.

THE PENNINGTON AIR-SHIP.—After some careful calculations on the Pennington air ship, from the figures given as to its size, weight, etc., the *Engineering and Mining Journal* comes to the conclusion that its promoters have evolved some new laws, logic and processes of which the engineering world is ignorant, or else they are destined to have their hopes of aerial navigation shattered as ignominiously as did their illustrious predecessor, Darius Green, and throws out a mild hint that the whole thing is a gigantic hoax, palmed off on a glib and unsceptible public by some over-zealous newspaper reporter. As the new comet in the firmament of science has not yet been discovered by the anxious and watchful astronomers at St. Louis, Chicago or New York, and since according to calculations it should have come into view, we are inclined to believe in the hoax theory.—*Ec.*

SHIP RAILWAY AROUND THE DALLES.—The U. S. Senate, it seems, has passed a bill appropriating \$2,800,000 to build a "ship railway" around The Dalles, on the Columbia River. In the House, Mr. Hermann thought \$2,000,000 would do. *Industry* thinks that the Government is hardly prepared to go into ship railways just yet. When a few have been made successful by private enterprise, it will be soon enough for the Government to make an attempt of the kind; besides, they had better finish the canal and sluices at the Cascades, and dredge out the estuary of the Columbia river before beginning at The Dalles.

MOVEMENT FOR A CANAL AT NIAGARA FALLS. In the House on Jan. 22d a joint resolution was offered memorializing Congress in favor of

the construction of a canal in New York at Niagara Falls, the passage of the Payne bill for that purpose being urged in the interest of commercial and agricultural interests West, and the military and industrial interests of the whole country.

GOOD HEALTH.

POISON IN HAT BANDS.—Enameled bat-bands should not be worn during the hot summer months. "A good many sore faces," said a well-known physician to a New York *Sun* reporter, "are caused every summer by poisonous sweat-bands in hats. Some men always insist on buying Derby hats with enameled sweat-bands, and if they wear them during the summer months a mild sort of blood poisoning is apt to result. As a man's head always perspires very freely under the sweat-band of his hat, the poison in the enameling composition is softened and released, but its unpleasant effects are seldom noticeable there. The very fact that the perspiration is constantly coming out of those particular pores prevents the poison from going in. But as each little bead of perspiration rolls down his face, it is charged with the poison, and if it happens to run over a little pimple, or a place where he has scratched his face, or cut it with a razor, the result will probably be unpleasant. A dozen tiny pimples will appear, and no matter how many 'blood-purifiers' he does himself with, his face will be dotted with little sores until he buys a hat with a good sweat-band. Straw hats are seldom made up with the enameled sweat-bands, and that fact is another reason why every man should wear them in the summer. Of course this warning does not apply to all hats with enameled sweat-bands. Some of them are perfectly harmless, but as it is impossible to tell which are good and which are bad without a chemical analysis, and as a chemical analysis would spoil the hat, enameled sweat-bands are good things to avoid in hot weather."

THE CURE OF LOCKJAW.—Not long ago a German physician seeking light on that terrible disease, lockjaw, found that inoculations with the blood and other fluids of the body of a victim failed to produce this malady; but when fluids were used which had been squeezed from the wound, or scraped from its immediate vicinity, which had caused lockjaw, then the disease was invariably produced. This, of course, would indicate that the direct cause—the specific poison of lockjaw—remains near its point of entrance, and that local treatment is imperative. Dr. Pavillon accepts this theory, and recommends subcutaneous injections of carbolic acid in the treatment of the disease. He cites the case of a boy, 15 years old, who was attacked with lockjaw in a severe form after being wounded on the foot. The usual remedies were at first applied without any effect. On the fourth day a one-per-cent solution of carbolic acid was injected near the seat of the injury. Similar injections were repeated every three hours during the first four days. Improvement began on the second day. Recovery finally took place. The injections, gradually decreased in frequency, were kept up until the twenty-seventh day. Another case of recovery under the same treatment has been reported.

TOOTH-PULLING IN CHINA.—The report of the physician in charge of the Ningpo Missionary Hospital for the past year contains, observes the London *Times*, some interesting observations on tooth-drawing in China. Dr. Daly remarks that Chinese teeth are much more easily extracted than those of Europeans. The native dentists are said to possess a wonderful powder, which is rubbed on the gum over the affected tooth; after an interval of about five minutes, the patient is told to sneeze, whereupon the tooth falls out. Dr. Daly has offered \$100 to any one performing the operation in this way in his presence, on condition that he allowed to choose the tooth and examine the mouth before and afterward. So far, no one will consent to perform the operation on these conditions.

DISBELIEVERS IN VACCINATION for smallpox should consider the statements just made to the French Academy of Medicine by Dr. Brouardel. While Germany loses only 110 persons per annum from smallpox, France actually loses 14,000, to be accounted for by the right way in which vaccination is enforced in Germany and by the carelessness of the Frenchmen. In 1865, when vaccination was not obligatory in Prussia, the mortality was 27 per 100,000 inhabitants. After vaccination was enforced, the mortality fell in 1874 to 3.60 per 100,000 and in 1886 to 0.049. At the present time, the mortality from this cause in France is 43 per 100,000.

HOW TO TAKE CARE OF THE BRAIN.—The brain stands the most abuse of any organ in the body. Its best tonic and stimulant is success. The worst and most depressing thing to it is failure. The most injurious effects come by using stimulants in early life. Young people should never use liquors, tea or coffee. The latter two may not exactly do harm, but they are conducive of no good. They act mostly on the brain and injure its growth very materially. Abundance of sleep is necessary. Eight hours is not more than enough. Sleep is the time of relatively lowered expenditure and increased repair.



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W. B. EWER, SENIOR EDITOR

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A. T. DEWEY.

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G. H. STRONG.

SAN FRANCISCO:

Saturday, February 21, 1891.

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Passing Events.

The Committee of the House of Representatives that has in charge the Senate Free-Coinage bill vote on the bill on Friday, and will probably report it back some day next week, but whether in time for passage, if it be amended, at this session of Congress, is a disputed question.

There is quite a material "drop" in the prices of both coal and iron this week. Coal has been held pretty high for some months and the reduction of \$2 a ton is quite important for manufacturing interests. It is thought there will still be further reductions in both these important staples.

The mining men won another victory this week in the Assembly when they passed a bill providing that suits brought by any of the valley counties against miners or mining corporations shall not be tried in the county by which the suit is brought. The vote was 50 to 10.

The country is called upon to mourn the loss of two more of its prominent men, General Sherman and Admiral Porter, both of great prominence in the Civil War and identified with the history of the country.

The Young America South Mining Company of Tuscarora, Nev., has discontinued and re-incorporated as the Optima Mining Company, under which name it will henceforward be "called" at the San Francisco Stock Board.

Mining and the World's Fair.

It is hardly probable that any of the Pacific Coast States or Territories will be honored or recognized by the selection of one of their residents for the chief of the mining division at the coming World's Fair at Chicago. Mining, in the eyes of most Eastern people, means something connected with coal and iron, and the gold, silver, copper and lead mining interests are of secondary consideration. This being the case, it is a foregone conclusion that an Eastern man will be chosen head of that department and most of his assistants will come from the Pennsylvania coal and iron regions. Very likely some New York man will be selected as chief for presumed executive abilities and some slight connection with the mining interests. It is the way these things usually are done and we can scarcely expect anything different this time.

The representatives from the Pacific Coast will scarcely be able to overcome the prejudices in the direction named, but they should concentrate their energies in insisting that each of the Pacific mining States and Territories shall have proper representation in the mining division, so that, aside from the general committees, there will be at least one man from each section whose business it is to see that the mining interests of his region have proper recognition and representation. If this course is not pursued, the precious-metal interests will be entirely overshadowed by those of coal and iron.

As many of these offices are salaried, they will be in great demand, and there is natural fear that they will be filled by the class of people who generally run after such things instead of by men fitted by experience and knowledge to do some good to the interests in question.

The coal and iron interests of the country are of great magnitude and in a position where there is no chance of their being ignored; but those of the precious metals and minor minerals are apt to be set too far in the background unless those identified with them take precautions and care.

It is greatly to be hoped that there will be no political preference in the selection of a chief of the department of mines and no desire to put some one in from a certain State simply because he is from that State. It needs a man of good executive ability and who is familiar with the whole mining industry of the country, not a single section alone. Some one should be chosen who has visited the various mining centers of the United States, has knowledge of the different conditions, and can give due recognition to each.

Probably no man in the United States has had better opportunities for observation of the mining industry in general than Dr. David T. Day, Chief of the Division of Mining Statistics and Technology of the U. S. Geological Survey. His annual report entitled "Mineral Resources of the United States," embracing all mineral substances except gold and silver, is one of the most useful and practical works issued by the Government. In its preparation he has many assistants skilled in the various branches whose work he supervises, and he also, in the course of this work, has visited all the important mining centers in the United States, both in the East and West. Dr. Day is an enthusiast in his work, young, energetic and active, and would be just the man to act as Chief of the Mining Division of the World's Fair. He is at the head of the mineral division of the 11th census, and has managed the immense business of that work with marked ability. If a man like this could be chosen, there would be no cause of complaint from any section, since his experience is such that he has appreciation of all the varied interests of the whole country and would not take a narrow view of the subject in any particular. Some such man as this ought to have the place. Then the Pacific Coast States would receive due recognition, and those in the subordinate positions would be men with some knowledge of the mining industry.

It will be remembered that not very long since the Walnut Grove storage-reservoir dam broke in Arizona, and 14 lives were lost. The heirs of the dead persons whose property was swept away by the flood brought suit against the water company, and the suit has just been decided in favor of the company.

Diamond Drill Prospecting.

In the colony of Victoria there are 15 diamond drills, the property of the Government, and worked at Government expense, employed in different parts of the mining regions. Five of these drills are used for prospecting for coal and the other ten are engaged in prospecting for gold at Clunes, Ballarat, Common, Warranheep, Coghills Creek, Lauriston, Lilliecur and Windermere for alluvial and at Woods Point, Stawell and Sandhurst for quartz. The total number of feet bored during the last three months for gold is 6329, for coal 3700, amounting in the aggregate to 10,029 feet. In addition to the number of feet bored by diamond drills, 1112 feet were bored in search of gold with Tiffin and hand-augers on contract.

As to the results of the diamond-drill work, at Clunes, the last bore is proving the deepening of the ground to the eastward. At Ballarat, it has proved ground sufficiently deep to show that there must be in the vicinity a deep lead the true position of which will be found before the drill is removed. At Lansell, no reef has been found, but warm water, showing existence of some lode or fissure at great depth. Experiment is being made to ascertain if the water contains gold or other metals or minerals in solution. At Coghills creek the last bore shows deepening ground to the eastward, in which direction boring will be continued to ascertain if the main lead exists in that direction.

At Lauriston the last bores proved satisfactory. The northern extension of the lead proved in a former series at Boggy Creek Boring is now in progress to prove the extension of two leads toward a junction with another. At Lilliecur the position of deep ground with wash has been satisfactorily proved. At Windermere the deep ground has been proved, with wash; boring will be continued to see if this is the deepest ground in the locality.

In the coal prospecting, three seams of coal were struck at Korumhnra and an immense bed of lignite was found at Morwell.

The Government also paid subsidies during the last quarter to the amount of £16,475 to mining companies, prospecting associations and co-operative parties who were prospecting ground where good would be done to others in case of finds.

It will be seen by these statements that the colony of Victoria greatly encourages its mining industry. Very complete and useful reports of operations are published. Roads are built, investigations are made, prospecting is done in new regions and all possible public aids to miners given. The mining industry is aided out of the public funds. They even encourage hydraulic mining which we have stopped here.

Proxies in Mining Elections.

The Act to regulate the giving of proxies, introduced by Assemblyman Bert, has been favorably reported by the Committee on Municipal Corporations and passed the second reading. It is intended to do away with the evils attending the present proxy system in mining company elections.

The proposed law provides that all elections must be by ballot, and every stockholder shall have the right to vote in person or by proxy the number of shares owned by him. The proxy must be in writing, duly executed and acknowledged by the bona fide owner of the stock at the time of such election, whether the same shall, at the time of said election, stand on the books of the corporation in his name or the name of some other person. Said bona fide stockholders may vote for each director or cumulate the shares and give one candidate as many votes as the number of directors.

Every person acting at an election in person or by proxy must be a member thereof, or a bona fide stockholder, at the time of the election, and must make affidavit to this fact before the chairman of the meeting, who is authorized to administer such oath, and no proxy shall be valid at any election unless it be the proxy of a bona fide owner of capital stock at the time of such election, and said proxy must contain the number of shares and the number of the certificate represented therein, and must be executed before a notary public or other officer authorized to administer an oath, by the owner of said stock, who shall make affidavit

that he is such owner of said shares. Brokers or persons holding stock as security, or officers of corporations or other persons in whose name stock is issued for business conveniences or otherwise, are not bona fide owners in the sense in which the words are used in this section. And brokers, or persons, or others so holding such shares or certificates of stock in their possession or security, or otherwise, must give to the owner of said shares of stock the numbers of said certificate or certificates upon demand of said owners. Any vote or election had other than in accordance with the provisions of this article, is voidable at the instance of any stockholder or member and may be set aside by petition to the Superior Court of the county where the same was held.

Every person voting stock, or in any way violating the provisions of these sections, or any person making, or procuring to be made, any false entry in the books of such corporations, contrary to the provisions of this section, shall be punished by a fine of not less than \$1000, or more than \$2000, and by imprisonment in the county jail for one year, or by both fine and imprisonment.

If this Act becomes a law, the brokers cannot use or lend the stock in their hands for proxy purposes at elections. Only bona fide owners can vote, and people owning no stock cannot use the stock of others. This same measure brought opposition at previous sessions of the Legislature, but the brokers now realize that the people who have been using the stocks of others in elections have not done any good to the stock business, but have rather created loss of confidence. The measure will apply to all corporations.

Gold Mining in Victoria.

The yield of gold in the colony of Victoria for the last quarter was 141,251 ounces, and showed an increase from quartz and a decrease from alluvial washings. The quantity of quartz crushed in the various mining districts during the past quarter was 196,119 tons, which yielded 89,545 ounces of gold, or an average of 9 dwt. 3 gr. Ballarat district crushed the greatest quantity, where 75,200 tons yielded 29,120 ounces. The highest average was in Gippsland district, where 818 tons gave a return of 6119 ounces of 15 dwt. 1 gr. per ton. There were also 6388 tons of quartz tailings treated, yielding 423 ounces, and 1406 tons of pyrites operated on for a return of 3558 ounces. The waste dust reported as having been sluiced during the quarter was 194,369 tons, which yielded 15,546 ounces of gold, an average of 1 dwt. 14 gr. per ton. There were also 5056 tons of cement crushed, yielding 576 ounces of 2 dwt. 6 gr. per ton.

There were 24,196 gold miners employed throughout Victoria during the past quarter, which was 393 more than the number at work the previous quarter. In quartz mining, 12,396 men were engaged, and 11,800 in alluvial—the number of Europeans being 20,893 and 3303 Chinese. Compared with last quarter's (June) returns, there was an increase of 418 in the former class and a decrease of 25 in the latter. The following shows the number of miners employed in each district on the 30th September last: Ballarat, 6129; Sandhurst, 4333; Maryborough, 3836; Castlemaine, 3286; Beechworth, 3202; Gippsland, 1707; and Ararat, 1703. The average value of gold produced per miner was the highest in the Ballarat district, namely, £35 6s. 5d., while for the whole of the colony the average rate per miner employed amounted to £24 13s. 5d.

Although the yield of gold for the quarter is less than that for the previous quarter, still there is an increase of £2307 in the amount paid in dividends during the former period as compared with the latter. The total sum disbursed during the quarter amounted to £126,531 15s. 4d. Of the several districts, Sandhurst has the largest number of dividend-payers.

At the close of the quarter there were 918 steam engines employed in connection with quartz mining, having an aggregate horsepower of 20,659, while 199 were employed in alluvial mining, having an aggregate horsepower of 6347. For quartz crushing 5880 stamp-heads were employed, and 152 crushing cement. The value of the whole of the machinery used in gold mining throughout the colony was estimated at £1,841,442, being £1,569,786 for quartz and £271,656 for alluvial.

The machinery used in each district was valued as follows: Sandbarst, £501,131; quartz, £492,611; alluvial, £3570. Balfaret, £399,884; quartz, £293,086; alluvial, £106,798. Castlemaine, £231,613; quartz, £212,022; alluvial, £19,591. Beechworth, £210,512; quartz, £167,248; alluvial, £43,264. Maryborough, £206,154; quartz, £138,780; alluvial, £67,374. Gippsland, £153,401; quartz, £137,647; alluvial, £15,754. Ararat, £138,697; quartz, £128,392; alluvial, £10,305.

"Faults" in the Great Basin.

In the district of the Great Basin the characteristic geological structure of mountain ranges is one in which faults play an important part. Foldings of strata are not wanting, but the greater features of relief appear to have been wrought by the displacement of orographic blocks along lines of faults. Sometimes a mountain range consists of a great block of strata cut off along one side of a profound fault, and inclined in the opposite direction until it descends beneath the plain constituted by the alluvial deposits of the adjacent valley. More frequently there are other faults

The Yosemite National Park.

(Continued from page 115)

from spoliation and possible extinction? Then, in order more fully to realize how well Congress has deserved in reserving and preserving these unequalled scenic repositories from spoliation and vandalism, let me merely outline some of the principal features of the Yosemite National Park. Beyond question, it has more wildly sublime scenery, within the same area, than can be found in any other section of the Sierra Nevada mountains. I have crossed the great chain, personally, in over 20 different places, from Mt. Shasta to Mt. Whitney (both of which I have climbed) and spent months at a time in searching for scenic treasures among them, therefore, should know whereof I write. Prof. Wm. H. Brewer, first assistant of the State Geological Survey, under Prof. J. D. Whitney, has frequently enunciated similar convictions. No description, even when accompanied with illustrations, can do it even approximate justice. Its beautiful and sublime features must be seen to be feelingly appreciated; and even then, words would be impotent to fittingly define its multitudinous charms.

ered by private ownership, no revenue, to meet incidental expenses, would be possible from that source, as provided by the Acts passed. This should engage the attention of friends to the measure before Congress adjourns.

ALTITUDES OF SOME OF THE MOUNTAINS IN THE YOSEMITE NATIONAL PARK.

	Feet.
Mt. Ritter, Sierra Nevada Range	13,139
Lyell	13,104
Davis	13,043
Black Mountain	13,000
Mt. McClure	12,974
Florence	12,883
Conness	12,698
Warren	12,364
Minarets	12,260
Red Mountain, Merced Group	11,686
Gray	11,554
Clark or Gothic Peak	11,512
Echo Peak, Cathedral Group	11,184
Cathedral	10,920
Mt. Hoffman, Hoffman	10,747
	H.

An Improved Fuse-Cap Fastener.

The device shown in the illustration, which has been patented by Mr. N. W. Moodey of Fresno, Fresno county, Cal., is especially designed as an improved implement for fastening the caps on fuse employed in exploding giant powder. The pliers are formed of two similar parts, connected by the pivotal rivet, each part

This implement is neatly gotten up of the finest cast steel and nickel plated. It is small and light but strong and well adapted for its purpose.

Uses and Value of Mica.

EDITORS PRESS:—I write to make inquiry in regard to isinglass, wishing to know its value per pound, if of value at all. In my claim I can get heavy blocks of it, from six inches square to two and three feet, and even more. I wish to sell either the product or the mine. Susanville, Lassen Co. B. P. PERGOV.

These same questions have been several times answered in the PRESS. Mica (of which a popular name is isinglass) is of little value on this coast, if any. We have made repeated inquiry and never found any one desirous of purchasing even the very best material. There is a great difference in the mineral, some of it being white and clear and in large sheets, and some being colored, stained or spotted, and being found in small pieces.

North Carolina produces 60 per cent of the mica yield of the United States. The other regions are in New Hampshire, New Mexico, Virginia and Dakota. Last year this country produced 48,000 pounds of sheet mica, worth \$70,000, a very considerable decrease from 70,500 pounds, worth \$142,250, the year before. The mica imported to the United States from India last year was worth \$57,541, the largest amount ever before imported.

These imports have gradually increased from an insignificant proportion until in 1889 they more than equaled the domestic product.

In 1883-84, the scarcity of large sheets of mica compelled stove-manufacturers to change their patterns and substitute smaller sizes. Large sheets are not so plentiful as small ones. As an instance of this change, it is stated that one stove-manufacturer who in 1884 bought \$30,000 worth of mica now only buys \$5000 worth a year. The increased use of furnaces instead of fire place heaters has also lessened the use of mica. Meanwhile a demand has sprung up for the mineral for use in the construction of dynamos. Strips of mica of various dimensions, but usually one inch wide and eight inches long, are made part of the insulating material in building up the armatures. But this new use has had little effect upon domestic mica. The imported mica has proved more satisfactory than the usual grade of domestic material.

The consumption of ground mica waste is increasing steadily, particularly as an addition to lubricants, and it is believed that this feature, which concerns about 90 per cent of the product of the mines, will add greatly to the stability of the industry. The best quality of waste is used for decorative purposes; the second quality is used without grinding for steam and water valve seats. The rest is sold for mixing with fertilizers. Some poor grades are used in making axle grease. The price of the waste is \$10 to \$15 per ton, according to quality. The former higher prices for mica do not now obtain, it running from \$1 to \$4 per pound, prepared for market.

The reason there is no market for it in California is that none of the class of manufacturers using it are represented here. The stove-makers buy the North Carolina material, which comes in commercial sizes, in boxes ready for use, and they use very few pounds a year. They prefer to buy it ready out in standard sizes rather than to buy sheets or blocks mined here and not prepared for use. There is plenty of very good mica in various parts of California, but no one has yet gone into the business of mining, splitting and cutting it ready for market. There is also a good deal which is inferior in quality and color. There is not at present any encouragement to mine the substance in this State, for there is no local market, and in the East the channels of trade are controlled by owners of mines which are developed and equipped to supply standard sizes in any quantity.

There are two firms in Richmond, Virginia, who grind the waste. Traylor & Hargrove grind 350 tons a year and the Richmond Lubricating Co. grind 200 tons. S. W. Blalock, Ledger postoffice, North Carolina, is an extensive dealer in mica. Eugene Munsell & Co. of New York use quantities in stove manufacture. These are the only persons in the business whose names we have been able to obtain. No one in this city, as far as we can learn, is purchasing the substance,



TROUGH PRODUCED BY FAULTING, NEAR MOUTH OF LITTLE COTTONWOOD CANYON, UTAH.

within the range trending parallel to its length and having thrown on the same side with the throw of the greater fault at the base. Lines of faulting may sometimes be traced upon the displacement of so recent date that the atmospheric ground by means of low cliffs or scarps due to the pheroid processes of sculpture have not yet restored the ordinary forms of topographic detail.

A prominent fault is continuously traced by its scarp past Dry Cottonwood, Little Cottonwood and Big Cottonwood creeks, all of which issue from the Wasatch range within a distance of ten miles. In the vicinity of the streams, and in the intervals between them, the surface disturbances are complicated, and for a distance of about five miles there run opposing scarps, between which a block has been depressed. The depressed block, traversing the lateral moraines, has carried down segments of these, leaving the distal portions as a pair of outlying hills.

The northern lateral moraine of Little Cottonwood, being broad and flat, exhibits a conspicuous trench where crossed by the depressed block, as shown in the engraving herewith. The walls of this trench are among the freshest of the fault scarps, being bare of vegetation along their upper courses, and in places too steep to be climbed. On the side nearest the mountain their height is from 40 to 60 feet. Here again it is evident that the total displacement was accomplished by a series of efforts, for between the two moraines the phenomena of the depressed block appear in the alluvial plain of Little Cottonwood creek, and the greatest scarp on the plain has a height of only 20 feet.

As well "attempt to measure a rainbow with a two-foot rule," as to try to paint any of its majestic and storm-defying organs and peaks; its mountain-crowned domes and rook-ribbed canyons; its isolated spires or jutting needles; its cloud-draped beds of eternal snow; its ancient moraines and living glaciers; its thousands-of-years-ago glacier-polished floors and ridges; its multiform and placid tree-margined lakes; its vast stretches of primeval forests; its granite solitudes dotted with grassy and flower-carpeted meadows; and all of these in storm or in sunshine, in winter as well as in summer, then could we feel but never describe them.

One of the many charms of this magnificent domain is that while feasting both eye and mind, one inhales the pine-laden breath of its fragrant atmosphere, and drinks hearty draughts of its life-giving ozone, so that experience teaches him that, apparently, he has at last found the real fountain of perpetual youth and the elixir of life; while the spirit becomes as buoyant and as free as the eagle he sees circling so unheeding and so defiantly among the beetling cliffs above and around him. If those who feel that life's lamp is burning low would forego the crowded city and seek these health-restoring retreats, they would find that a new supply of the oil of life could here be found, and a new lease of health and renewed strength would be made out to them, and possibly add to their years of enjoyment and of usefulness.

As all bona fide entries are excluded from the provisions of each Act creating these National Parks, and as nearly every hotel site within their boundaries is already taken up and cov-

having a cheek with notches, at the sides of which are cutting edges for cutting the fuse. The curved jaws beyond the cheek pieces, when closed, form a circular aperture, around which the jaws are beveled, one jaw having a tongue which fits in a groove in the other jaw.



MOODEY'S FUSE-CAP FASTENER.

The pliers are employed for contracting the end of the cap on the fuse firmly and absolutely water-tight, thus avoiding the dangerous operation of digging out wet and unexploded loads. Miners who have used implements of this class will appreciate the improvement in the one designed by Mr. Moodey. The instrument crimps the cap on the end of the fuse firmly. The fuse-cutter is simple and efficient.

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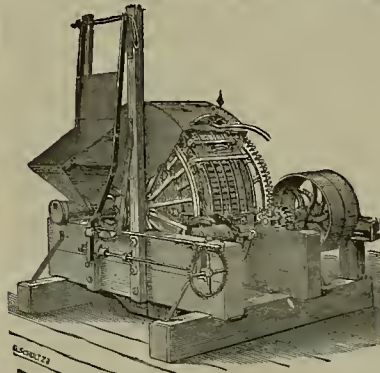
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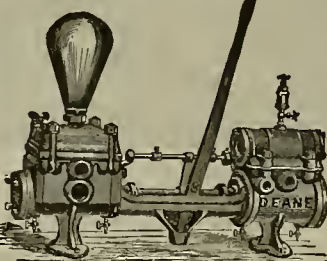
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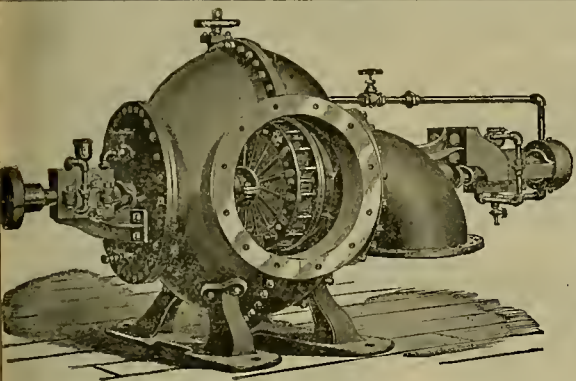
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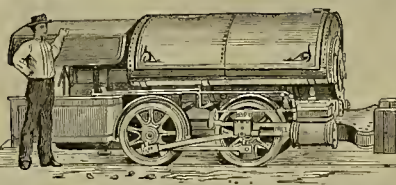
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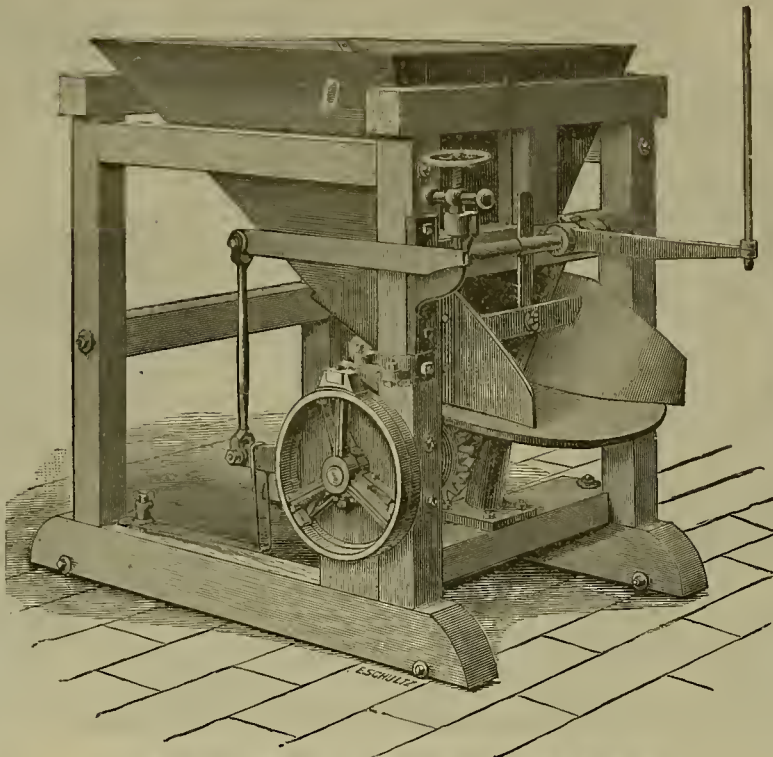
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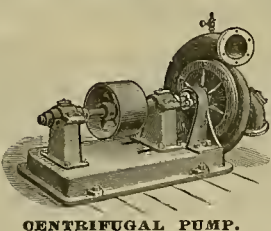
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Manufacturers of

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ALL SIZES.

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Iron cut, punched and formed, for making pipe on ground. All kinds of Tools supplied for making Pipe. Estimates given. Are prepared for coating all sizes of Pipe with a composition of Coal Tar and Asphaltum.

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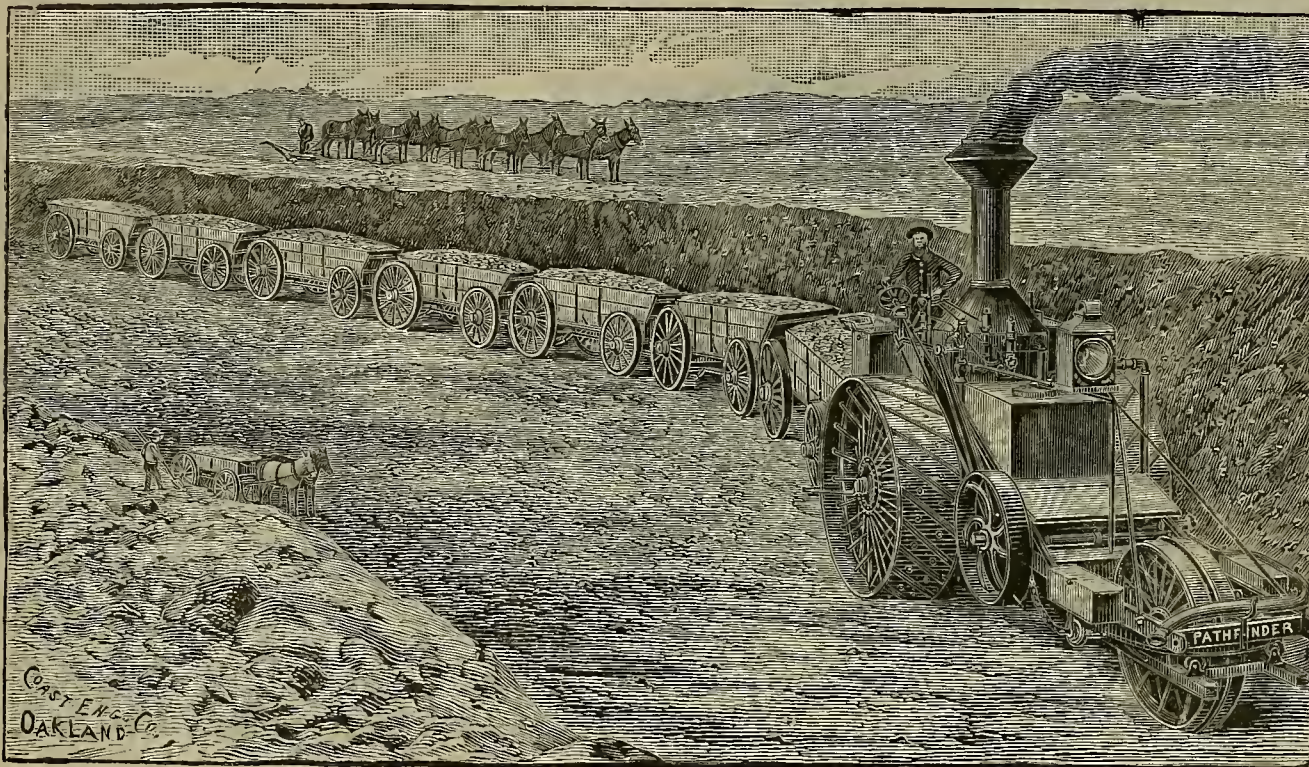
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ATTORNEYS AND COUNSELORS AT LAW, No. 530 California Street, Telephone No. 1746. SAN FRANCISCO, CAL.

SITUATION WANTED.

BY A COMPETENT MINING AND MECHANICAL Engineer, a position as Superintendent of a Coal Mine, near good school; 20 years experience; can invest some capital if desired. Address B. E., Box 4, this office.

STEAM VERSUS MULES---MAMMOTH AND PRACTICAL HAULING.



THE ACCOMPANYING CUT
Is from a photograph taken while at
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It is Cheaper and More
Expeditions.

One Traction Engine will do the
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Best's Traction Engines have been
in practical use for over two years,
hauling coal, lumber, gravel and
grain, one of which is now hauling
cane in the Sandwich Islands.

It will do the work of
100 Horses.

Plowing reduced to a minimum
cost, and from 35 to 45 acres plowed
each day at an expense of 50 cents
to 60 cents an acre.

Three sizes built, 30, 40 and 50-
horse power, and

24 Best Traction Engines
at Work Now.

It hauls the Gang Plow and Har-
row, propels the Best Combined
Steam Harvester and moves along
majestically with a train of wagons
loaded with grain for the warehouse.

GOLD MEDAL

Awarded the Best Traction Engine
by the State Agricultural Society at
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BEST'S TRACTION ENGINE

IS "THE BOSS OF THE ROAD" AND "THE MONARCH OF THE FIELD."

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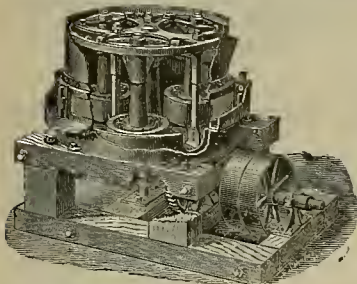
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Mining Machinery of Every Description. Steam Engines and Shingle Machines.

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GELATINE-DYNAMITE, Stronger than Dynamite and even Safe in Handling.

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FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blast
ing Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and
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W. T. Y. SCHENCK—Dear Sir: We find your "Red-Cord" Square Flax Packing the "Boss." Yours truly,
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These SHOES and DIES are in extensive use in all the mining States and
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ALSO VIGORIT "LOW" POWDER FOR EARTH AND WOOD.

Are prepared to supply purchasers in quantities to suit. Contracts made for future
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For information concerning this process for the re-
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THE RUSSELL PROCESS CO.,
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TUBBS CORDAGE CO.

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Constantly on hand a full assortment of Manila Rope,
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Extra sizes and lengths made to order on short notice.
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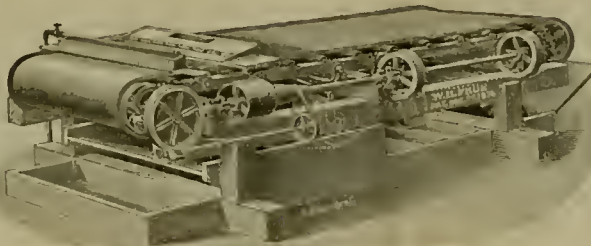
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The Best Ore Concentrator in the market, having double the Capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, crushing 350 tons per day, and is giving entire satisfaction as against 48 plain Belt Machines, taking the Pulp from the other 120 Stamps.

Price of Improved Belt Frue Vanner, \$825, f. o. b.
Price of Plain Belt Frue Vanner, \$575, f. o. b.

For Pamphlets, Testimonials and further information apply at office.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., Room 15, No. 132 Market Street, San Francisco, Cal.



Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.
DEAR SIRS:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

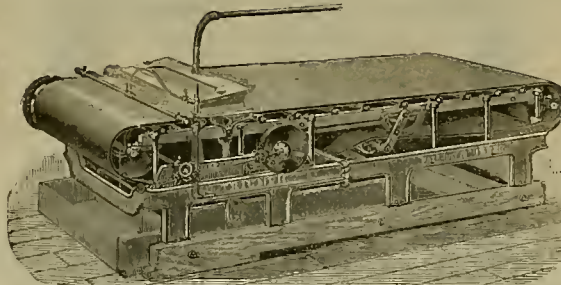
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased.
ADAMS & CARTER.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt - - - - - \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.



JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)

Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
GRASS VALLEY, NEVADA CO., CAL., NOV. 10, 1885.
Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.

GENTLEMEN:—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices.

(Signed) Sup't North Star and Original Empire Mining Co.
N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

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MINING AND QUARRYING
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— MANUFACTURERS OF —

Centrifugal Roller Steel Mills,

FOR PULVERIZING ORES, WET OR DRY,

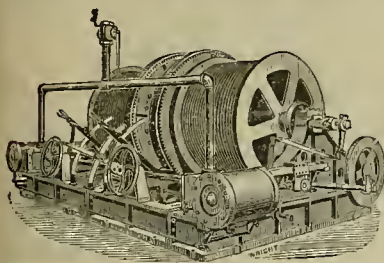
For Amalgamation or Concentration, and for Manufacture of Cement, Fertilizers, Paint and all other purposes for which grinding or pulverizing is required.

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1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.

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PARKE & LACY CO., Agts., San Francisco.
Send for Catalogue.

ATTENTION, MINERS!

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Union Rock Breaker

For Sale Cheap.

2500 MISSION ST., SAN FRANCISCO.

GRANGER'S ROLLER STAMP MILL

Beats them all. Works dry ores. Makes even granulation. No dead work, hence minimum wear.

A. P. GRANGER, Denver, Colo.

GRANGER'S DRY ORE SEPARATOR

The very best. Uses no water. No freezing up. Saves hauling waste. Saves high percentage. Send for circulars.

A. P. GRANGER, Denver, Colo.

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N. W. Corner Main and Howard Sts., San Francisco,

— MANUFACTURERS OF —

Stationary and Compound Engines, Flour, Sugar, Saw and Quartz Mill Machinery.

AMALGAMATING MACHINES, CASTINGS AND FORGINGS Of Every Description
ALL WORK TESTED AND GUARANTEED.

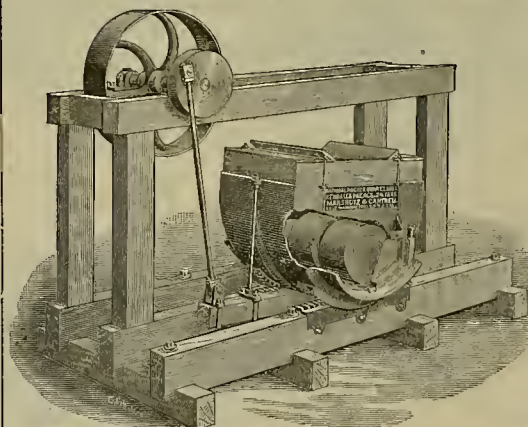
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NATIONAL ROCKER QUARTZ MILL.

KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY, 12 Tons in 24 Hours. 3 H. P.

MARSHUTZ & CANTRELL, Sole Manufacturers.



Send for Circulars and Price List.

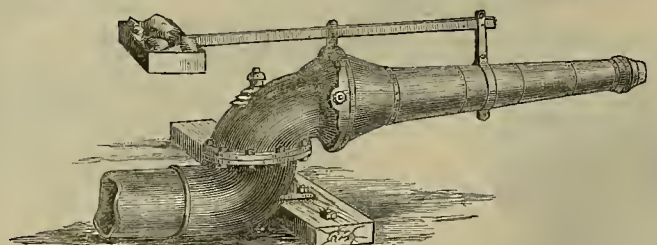
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The Patentee and Manufacturer cordially invite miners to critically examine and pass judgment upon this improved system of milling and amalgamating ores in the following particulars:

1. The cost is less than one-half of stamps of same capacity.
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6. There is no wear except on shoes and dies.
7. In point of amalgamation it is superior to any other machine in use.
8. In its simplicity of construction.

We challenge competition with Stamps, Ball Pulverizers or any other ore crushing machines now before the public.

IMPROVED FORM OF HYDRAULIC GIANTS.



THE ABOVE CUT ILLUSTRATES THE IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture. We guarantee purchasers of this form of Giants against all costs, expenses or damages which may arise from any adverse suits or actions at law. We are further prepared to furnish Single-Jointed Giants when required. Prices, discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent on application.

JOSHUA HENDY MACHINE WORKS, 39 to 51 Fremont St., San Francisco.

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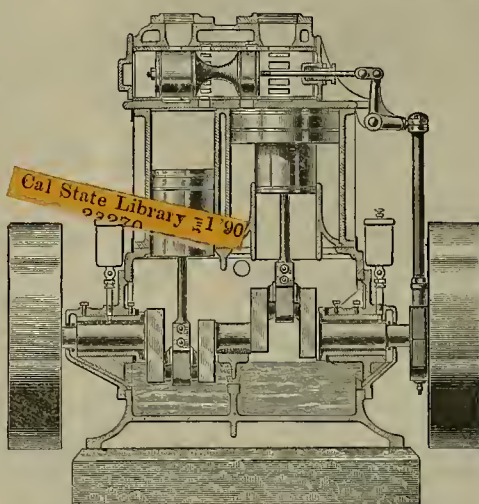
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Bullock's Diamond Drills

GOLDEN GATE CONCENTRATORS,
GREATEST CAPACITY OF ANY CONCENTRATOR MADE,
One Machine Taking Pulp from 10 Stamps.



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COMPOUND, 44 ENGINES,
5215 HORSE POWER.

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JUNIOR, 166 ENGINES,
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Grand Total, 309 Engines, Aggregating 13,975 Horse Power.

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OFFICE AND WORKS, 114 AND 116 BEALE STREET, SAN FRANCISCO,

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DOW'S IMPROVED STEAM PUMPS,

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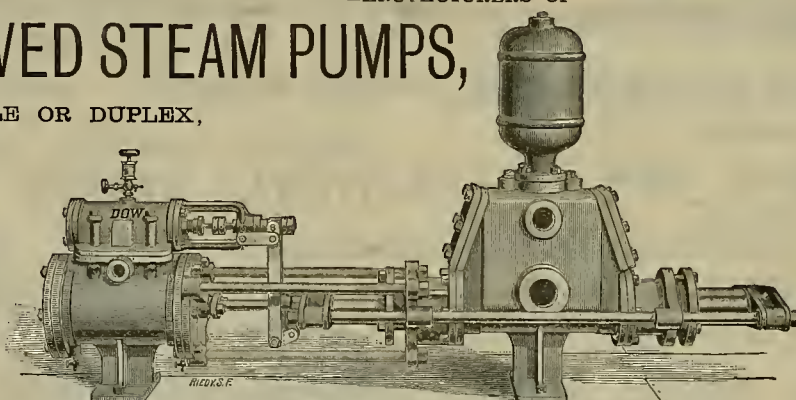
For Every Possible Duty.

Mining Pumps,

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Independent Air Pump and
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FOR STATIONARY ENGINES OR STEAM PUMPS.

POWER PUMPING MACHINERY,

SPEED GOVERNORS,

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Regulators,

FOR STEAM PUMPS, ETC., ETC.

CORRESPONDENCE SOLICITED.

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IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER
AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates Replated, Bought, or Gold Separated. THOUSANDS OF ORDERS FILLED.

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68, 70 & 72 First St., San Francisco, Cal.

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JUSTINIAN CAIRE, Agent,

521 & 523 Market St., San Francisco,

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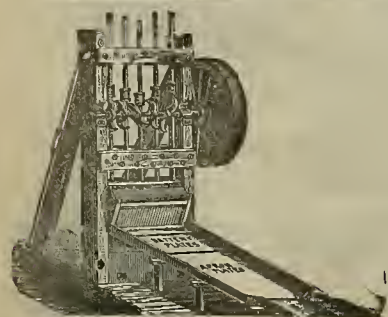
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IMPORTANT TO GOLD MINERS! SILVER-PLATED AMALGAM PLATES for SAVING GOLD IN QUARTZ, GRAVEL AND PLACER MINING. PRICES GREATLY REDUCED.

Only Refined Silver and Best Copper used. Over 3000 Orders filled. Fifteen Medals Awarded. Old Mining Plates can be Replated. Old Plates Bought, or Gold Separated.

These Plates can also be purchased of JOHN TAYLOR & CO., Corner First and Mission Sts

San Francisco Gold, Silver and Nickel Plating Works, 653 & 655 Mission St., San Francisco, Cal., E. G. Denniston, Prop'r.
Our Plates have been used for 20 years. They have proved the best. We adhere strictly to contract in weight of Silver and Copper. SEND FOR CIRCULAR.

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An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXII.—Number 9.
DEWEY & CO., PUBLISHERS.

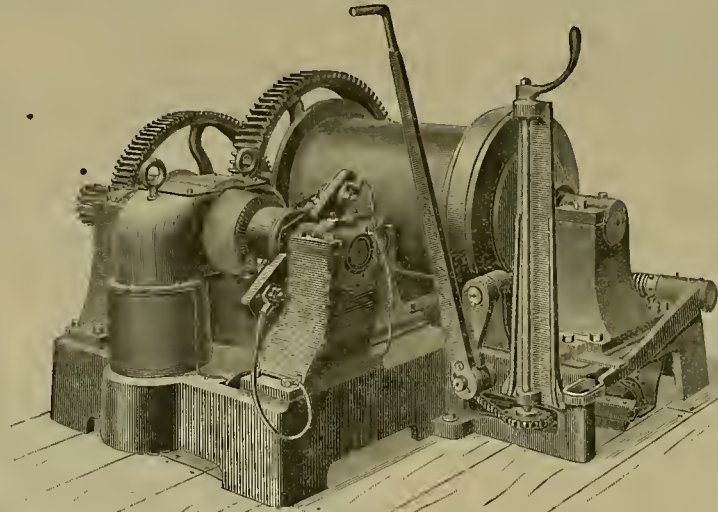
SAN FRANCISCO, SATURDAY, FEBRUARY 28, 1891.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

The Electric Hoist.

One of the recent applications of electricity for general-power purposes is the electric hoist, which is shown in the accompanying illustration. In this particular field horses have been supplanted by steam, which in turn is now supplanted by electricity, there being the same advantages in this piece of apparatus which are found in the stationary motor for ordinary power purposes. The electric hoist manufactured by the Thomson-Houston Motor Company is simple in construction; it is compact, easy to manipulate, and does the work required quickly and well.

The motor is of the same class as employed for stationary work, with the exception that it is series wound, the speed being regulated by a rheostat placed underneath the drum and controlled by a handle at the operator's right hand. The friction clutch is controlled by a slight motion of a lever held in the left hand of the operator, and is so well adjusted that the heaviest loads can be raised, lowered or held without the use of the brake. The brake consists of an iron strap lined with wood and encircling the drum for more than three-fourths of its circumference. It can be applied by a simple pressure of the foot. The pinions and gears are made of alternate discs of steel and rawhide, and run comparatively without noise,



ELECTRIC HOIST FOR MINING WORK.

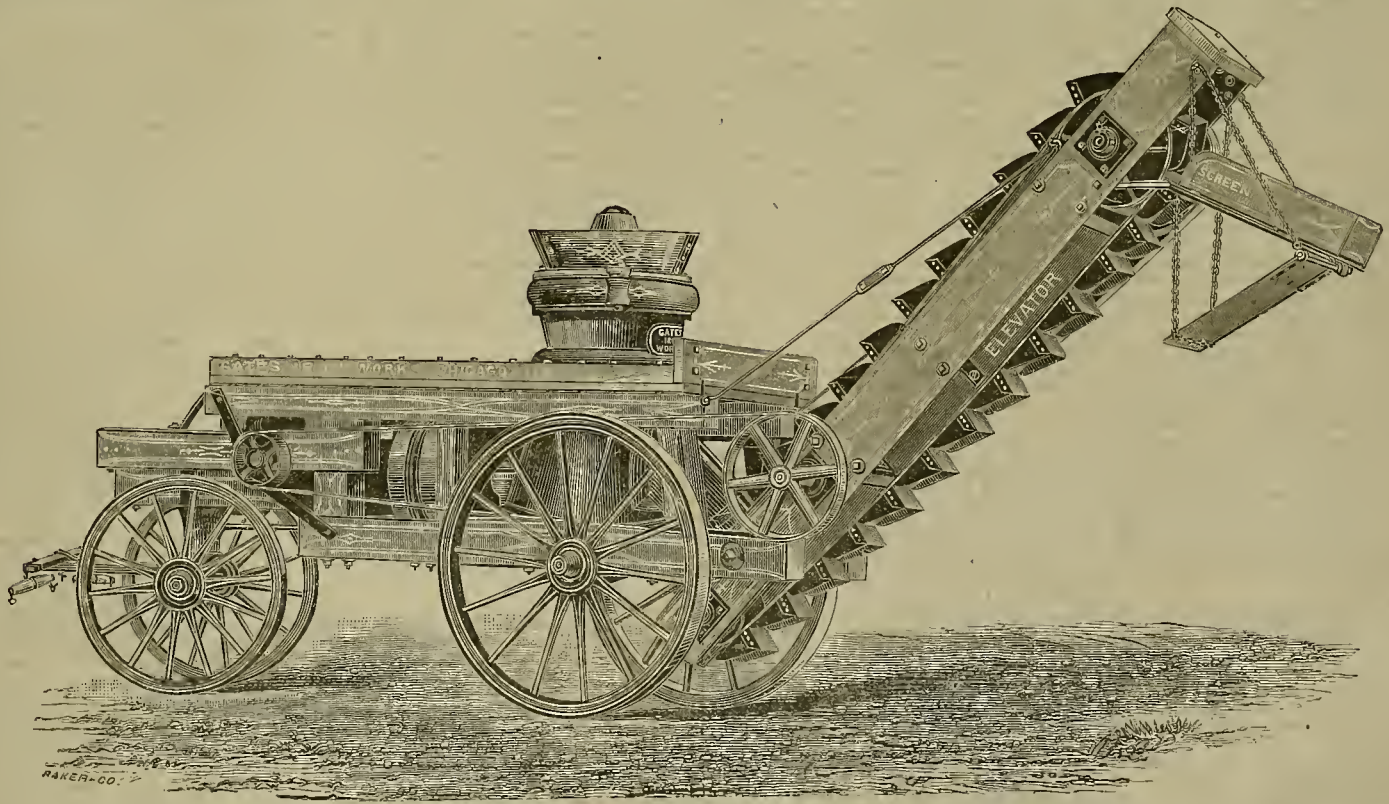
mission is necessary. Electricity has proved itself thoroughly fitted to perform this transmission. Where steam-power is used, a concentration of steam plant and distribution of and metallurgical work has received the attention of its most progressive engineers, with the result that the company is now prepared to furnish motor and power apparatus for hoisting,

Portable Ore-Breaker.

The Gates rock and ore breaker, now a very popular machine for mining and other work where ore or rock is to be broken, is arranged in a variety of ways so as to suit special purposes. One of these is the breaker in portable form, shown in the cut, for street or other work where it is necessary to move often. With it is an elevator and a screen for separating dust and dirt from broken stone when required. The elevator or screen or both can be readily detached, for when it is not desired to separate the dust and dirt from the broken stone, the screen will not be required.

The wagon or framework is made of best seasoned oak so as to stand strain. This machine is very useful in road-building, and under certain conditions could be utilized in small mining camps, as, for instance, where many arastras are in use. A portable engine and a crusher would largely help in adding to the capacity of arastras.

THE SPRING HILL DISASTER.—The Mayor of Spring Hill, N. S., has issued an appeal to the public of the cities and towns throughout Canada and the United States asking for aid in behalf of the widows and children of those killed in the mine disaster. The total number dead is now known to be 120. It is evident



THE GATES PORTABLE ROCK-BREAKER WITH ELEVATOR AND SCREEN.

while the use of carbon brushes reduces the wear on the commutator to a minimum.

The mining industry presents a large field for the introduction of electric-power, and one to which the system is peculiarly adapted. Where water-power is available, some means of trans-

electricity is recommended by the best engineers.

The Thomson-Houston Motor Company has been quick to perceive the needs of such cases and adapt its apparatus to them. The question of proper electrical-power apparatus for mining

haulage, drilling, ventilating, pumping, etc., and will furnish plans and estimates for special work.

The earliest known coins were issued by the Greeks in the seventh century B. C.

much suffering will result unless the response to the appeal is hearty and prompt. Not one of the men who could probably throw light upon the cause of the explosion is left to tell the tale. Not only are the coffins idle, but all business in town is at a standstill.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

The Keltz Mine, Tuolumne Co.

[From Our Own Correspondent.]

EDITORS PRESS:—While traveling through Tuolumne county in the interest of the PRESS, I visited the Keltz mine. The property has frequently been referred to, and as the mine is now in a very promising condition, I think your readers will be interested in a short report based on a personal inspection by your correspondent.

The Keltz mine is situated on the east bank of the south fork of the Stanislaus river and is about ten miles north of Soulsbyville, Tuolumne Co., Cal.

The strike of the vein is almost north and south and at this point almost parallels the river. The property consists of three full locations each of 600 feet in width by 1500 feet in length, aggregating 600 by 4500 feet on the vein.

The vein is inclosed in metamorphic slate walls and is accompanied by a mineralizing dyke of porphyry. The width of the vein is from two to five feet with a dip of 55 degrees east.

The quartz is brittle, white, with a ribbon structure carrying free gold, galena and a fair per cent of sulphurets.

The situation of the mine is everything that could be desired for economical development and future working. The north extension reaches down to the river's bank; from this, the north end, a drift can be run for 4500 feet on the vein and a hack 2000 feet on the dip of the vein to and at the south end, on an average of 1500 feet on the 4500 foot of the vein.

Thus far all of the work has been confined to the center location, which is about 800 feet above the river. The present work consists of two tunnels which are being driven to cut the Floyd shoot. This shoot crops 1750 feet above the river. The vein is very strong and prospects across the two to eight feet of vein from \$11 to \$15 a ton throughout the 140 feet that the shoot has been opened. The lower tunnel is now in 650 feet and is being driven ahead on the vein which is here two to four feet in width. The tunnel has about 100 feet to go to cut the Floyd shoot, which it will tap 625 feet on the dip of the vein. The upper tunnel is 500 feet vertically or 625 on the dip, above the lower tunnel, and is now in 150 feet. This tunnel was run at an angle of 5° east and has just intersected the Floyd shoot at its north end. The vein is here opening up in a very satisfactory manner, showing not only the strength that is evident in the lower workings, but a larger per cent of free gold gathered and sulphurets with a small per cent of zinblend. The superintendent is very conservative and will not admit that the high-grade ore extracted at this point is the average of the vein until the shoot has been run to a greater distance. Everything indicates that a richer grade of ore fills the vein at this depth than on the surface and that when the lower tunnel reaches the shoot (625 feet deep) a still higher grade of ore will be encountered.

North of the present tunnel, 400 feet, is a shaft that was put down 400 feet on the vein, which here averaged three to four feet in width of ore that has milled from \$5 to \$54 a ton. The present plant consists of a 10-stamp mill with eliver plates and canvas tables for concentrating. While this has answered the purpose in the past, the mill should be improved by the addition of rock-breakers and concentrators to reduce expenses and increase returns. The mill, ventilating fans and shops obtain power from Knight water-wheels, which are here driven by a very small amount of water, owing to the 550 feet of pressure. This can be increased to 900 feet at the present location of the mill; or by moving the mill to the river's edge, 1700 feet of pressure can be obtained from the ditch, or the free water of the river can be utilized. The entire property is heavily timbered with monerohs of the cedar, fir, yellow and engar pine in quantity far more than sufficient for the most extensive workings of the mine for all time.

By reason of the exceedingly favorable situation of the mine, the great water pressure, size of vein, character of rock and manner in which the mine is operated, the ore, with the present plant, can be mined and milled at a cost not to exceed \$3.50 a ton, and once the capacity of the mill is doubled, and necessary improvements added, this will be reduced to \$2.50 a ton.

The mine is being developed under bond by an English mining syndicate, with Mr. W. Sharwood, who is well known as the superintendent of the famous Sonlhye mine, in charge. In this property the English investors have adopted the methods of the most successful California mining operators in first proving the mine. They, with the people of Tuolumne county, are to be congratulated on the success that has crowned their efforts in the development of the Keltz, which, by reason of its strong vein, milling value and length of shoots, is destined to prove a second Sonlhye.

E. H. SCHAEFFLE, Ex. U. S. M. E.,
Murphys, Cal., Feb. 16, '91.

Mines of Washington.

Opening Up an Important Mineral Country In the Pacific Northwest.

EDITORS PRESS:—It is the purpose of this letter to inform the readers of the PRESS in regard to the mineral resources of Washington—a State which has hitherto been regarded as a lumber region and especially noted for its tall firs and mammoth cedars. Its coal veins have also been known abroad to some extent, particularly in San Francisco, where the mines are chiefly owned and where a ready and lucrative market has been found for the product of the mines. It is the object of this communication to speak principally of the gold, silver, lead and copper districts, leaving the coal and iron, for another time.

Puget Sound Precious Metals.

The country west of the Cascade mountains, or better known as Puget Sound, has always been regarded by miners and prospectors as difficult of access and very hard to prospect in by reason of the dense undergrowth of bushes and moss. During the excitement attending the Frazier river stampede quite a number of Californians attempted to prospect in the vicinity of Mount Baker, but the effort was attended with indifferent results. The Cascades were as a sealed book to the Californians of that day, as they have been to nearly every one else up to last year, when persistent effort succeeded, and there is no longer question as to the existence of gold, silver and lead in paying quantities in the Cascades, extending from Old Mount Si to Mount Baker, a distance of over a hundred miles.

The New Districts.

The region above mentioned is divided up into five mining districts, as follows: Silver Creek, Snoqualmie, Monte Cristo, Sultan and Cascade. The ore in all these districts presents the same characteristics, and the assays are from 20 to 100 ounces silver, from a trace to \$20 in gold, and from 30 to 50 per cent lead. In some instances it runs higher, but the above may be considered a fair average. The country rock is granite, porphyry and slate, and the ledges, which are numerous, are from 4 to 20 feet wide and well defined.

Silver Creek District.

This district is located on Silver creek, one of the principal branches of the North Fork of the Skykomish river, in Snohomish county. It is the source of three other considerable streams—the Sultan, Wallace and Sauk, the latter flowing northwesterly and emptying into the Skagit. This district is distant from Seattle about 90 miles, and is reached by way of Seattle to Snohomish by the Seattle, Lake Shore & Eastern railroad 31 miles; from Snohomish to Sultan City 17 miles by wagon-road or river, thence by trail to Mineral City. This trail will probably be widened to accommodate wagon transportation this spring, as the rapid settlement of the country and increased travel demand better facilities. Engineers are now in the field making preliminary surveys for a railroad to connect the mines with the Seattle, Lake Shore & Eastern, and this branch will probably be built this season. Work is being prosecuted on the Jaspercon, National, Vandalia and Silver Lake group with very gratifying results, and considerable ore is accumulating on the dumps, but no stoping has yet been done on any of the properties mentioned. The ore thus far extracted has been from the working tunnels. About 300 locations have been made in Silver creek district and the site of Mineral City laid out. This will probably be the principal mining camp and trading-point for this district and Monte Cristo, which lies to the east of it. Companies are forming with sufficient capital to develop many of the ledges, and prospecting parties are being organized for further exploration. The indications are that Silver creek will be the scene of great activity this season.

Monte Cristo District.

This district was organized last summer, and adjoins Silver creek on the east and north. Important discoveries of silver-lead ore were made early in the season in the Silver Lake group, and California capital has been interested in their development. Two tunnels have been run and are now in from 100 to 150 feet, showing large veins of rich ore carrying a larger percentage of gold than any yet found in the Cascades. Considerable ore has been taken out, but no shipments will be made until transportation facilities are secured. This district, like Silver creek, offers great inducements to the capitalist, miner and prospector. About 30 locations have been made in Monte Cristo, and there is a wide and attractive field for prospectors.

Sultan River Placers.

Sultan river, which has its source in Silver Creek district, is being prospected for gold, with good results. A company formed for the purpose of turning the river from its natural bed, has been at work for some time past and considerable work has been accomplished. The company anticipates completing the work this season. There is an abundance of water during the entire year, and hydraulic mining can be carried on successfully.

Cascade District.

This district, which takes its name from Cascade creek, one of the principal branches of Skagit river, was organized last summer after the discovery of the Boston mine was made. A

slide in the canyon exposed a large body of galena carrying from 50 to 100 ounces of silver.

Helena (Montana) parties made personal examination of this property soon after its discovery and bonded it for \$150,000. The sale has since been consummated and preparations are being made to work it on an extensive scale. From 50 to 100 locations have been made in this district, many of them very promising prospects. Cascade district can be reached from Seattle by way of the Seattle, Lake Shore & Eastern railroad to Sedro, thence to Hamilton by the Seattle & Northern. From Hamilton there is a wagon-road along the Skagit river to the mouth of Cascade creek, about 25 miles, thence by trail to the mines. Skagit river is navigable to this point by small boats for several months in the year, but the greater portion of the transportation is by wagon and pack animals.

Snoqualmie District.

Prospecting has been carried on very successfully in this district during the past season, and many new ledges discovered. The ore carries gold, silver and lead. The district is about 60 miles east of Seattle and is accessible by the Snoqualmie branch of the Seattle, Lake Shore & Eastern, which will be extended into and beyond the district this year.

The Advantages.

These mining districts possess many advantages over those of the interior. The country in which they are located is heavily timbered with excellent fir, cedar and hemlock. They are but a short distance from tidewater, with which they will soon be connected by rail. Coal of superior cooking quality can be obtained in unlimited quantities within a few miles of the gold and silver mines. Water is also abundant the year round. Smelting and reduction works can be built on tidewater at Seattle, where the ores of Alaska, together with those of Coeur d'Alene, can be combined and worked with those of Washington.

Mining Bureau.

Seattle, which is the natural center of this extensive mineral country, has been slow to appreciate the advantages to be reaped by the opening of these tributary mines and the erection of sampling-mills, smelters and reduction works. Within the past month, however, there appears to have been an awakening and the Chamber of Commerce is calling to its assistance parties familiar with the mines for the purpose of gaining all the information possible, and a Mining Bureau will be organized and in successful operation by March 1st. Samples of ore will be collected from all the mining districts and cabinets arranged in rooms set apart for mineral display.

A. N. H.

Seattle, Wash., Feb. 20, 1891.

The Union Mine, Copperopolis.

[From Our Own Correspondent.]

Copper Smelting in Calaveras County.

EDITORS PRESS:—At the time of my visit the genial superintendent, Mr. G. McM. Ross, formerly on the Comstock, was extremely busy and through press of duty could not give me the attention he wished, and for want of time I could not accept his kind invitation to remain until the following day and then inspect the mine and plant. The readers of the PRESS all have in their back numbers a complete description of the Union mine, and in consequence it is only necessary to state what the present plant consists of and the methods at this time employed.

In the mine the ore is coming from the No. 1, 2, 4, 5, and between 7, 8 and 9 levels. The ore bodies run up to 22 feet in width, or an average of 10 feet of vein matter. A large new body of ore has just been opened between the 4th and 5th level, and north of No. 1 shaft. The present output is 60 tons of ore a day. The old Keystone shaft is being cleared out and retimbered.

By reference to former letters by myself, it will be seen that the ore from the Union mine runs from 10 to 15 per cent in copper. All ore from 10 per cent up is smelted; that below is roasted, leached and converted into copper cement. The ores of the mine are especially adapted to this process. The ores as they come from the mine are dumped into chutes and taken thence by tram cars to the roasting floors and smelter, about a half mile distant. The ores suitable for smelting are treated by the Orford Copper Smelter Co., who have here a plant which has been under the charge of Mr. S. C. Lake of the Orford Co. of New York. At present the furnace is just being relined. The capacity of the smelter is ten tons of ore a day, making 450 tons of copper matte per month, equal to 400,000 to 450,000 pounds of fine copper.

This smelter differs from other copper smelters in this: The furnace is dry—not jacketed—built of solid brick with iron cases, which act as an air-chamber in the distribution of the blast. The blast is discharged from the fan directly into the air chamber. The furnace is rectangular, 11½ feet long in the clear, 4½ feet between tyeres, 7 feet from hot-tom to feeding door. The furnace works without the use of crucibles, discharging directly into siphon-pot, where mechanical separation takes place, the metal flowing from one end of the pot, the slag from the other. Separation is then completed.

The slag will not assay, on the average, over

5 to 8-10 of 1 per cent in copper, while the metal will assay from 45% to 60% of copper. The metal after leaving the siphon pot is spilled on to the cast-iron plates in thin sheets to facilitate the breaking up of the copper for sacking. The metal is then sacked and shipped to the Orford Copper Works, N. Y., where it is converted into pure copper.

Since my last visit the smelter has been put in operation and the roasting and leaching plant materially increased. Already great piles of smelting ore stretch out in every direction, reminding one of the burning oil-banks in the coal regions of Pennsylvania. From these reserves the company in time will have an immense revenue from their copper cement alone. The property is now, as in the past, managed by Col. Horace D. Randlett, the well-known copper king.

E. H. SCHAEFFLE

Comstock Ore Extraction.

The following sworn statements of the ore and mill product of Storey county, Nevada, mines have been filed in the Assessor's office:

BELCHER—Produced 3250 tons of ore, yielding bullion valued at \$45,741. Cost of extraction, transportation and reduction, \$62,682; cost of production above yield, \$16,941; cost per ton, \$19.28.

CONSOLIDATED CALIFORNIA AND VIRGINIA—Produced 21,340 tons of ore yielding \$275,496 in bullion. Cost of extraction, \$178,101; transportation and reduction, \$114,160; total cost, \$292,261. Cost of production above yield, \$14,765; yield per ton, \$13.70.

CHOLLAR—Produced 6765 tons of ore, yielding \$84,520 in bullion. Cost of extraction, \$63,115; transportation and reduction, \$47,355; total cost, \$110,470. Cost of production above yield, \$25,950; yield per ton, \$16.33.

CONSOLIDATED IMPERIAL—Produced 1135 tons of ore, yielding \$15,041 in bullion. Cost of extraction, \$34,713; transportation, \$1135; reduction, \$6810; total cost, \$42,658; cost of production above yield, \$27,617; yield per ton, \$13.25.

CHALLENGER CONSOLIDATED—Produced 125 tons of ore, yielding \$1643 in bullion. Cost of extraction, \$14,840; transportation, \$125; reduction, \$753; total cost, \$15,718; cost of production above yield, \$14,075; yield per ton, \$13.15.

CONFIDENCE—Produced 72 tons of ore, yielding \$882 in bullion. Cost of extraction, \$10,337; transportation, \$72; reduction, \$432; total cost, \$10,841; cost of production above yield, \$9059; yield per ton, \$12.25.

CROWN POINT—Produced 3787 tons of ore, yielding bullion valued at \$34,571. Cost of extraction, transportation and reduction, \$55,650; cost of production above yield, \$21,079; yield per ton, \$14.70.

JUSTICE—Produced 2399 tons of ore, yielding \$41,478 in bullion. Cost of extraction, transportation and reduction, \$48,606; cost of production above yield, \$7128; yield per ton, \$20.

MONTÉ CRISTO—Produced 358 tons of ore, yielding bullion valued at \$2408. Cost of extraction, \$1432; transportation, \$268; reduction, \$1432; total cost, \$3132; cost of production above yield, \$724; yield per ton, \$8.74.

OVERMAN—Produced 5150 tons of ore, yielding \$68,110 in bullion. Cost of extraction, \$33,398; transportation, \$5159; reduction, \$30,901; total cost, \$74,458; cost of production above yield, \$6348; yield per ton, \$14.46.

OCCIDENTAL—Produced 4257 tons of ore, yielding \$78,273 in bullion. Cost of extraction, \$45,900; reduction, \$30,056; total cost, \$73,956; yield above cost of production, \$4317; yield per ton, \$17.37.

SAVAGE—Produced 9622 tons of ore, yielding bullion valued at \$130,053. Cost of extraction, \$74,924; transportation and reduction, \$67,354; total cost, \$142,278; cost of production above yield, \$12,220; yield per ton, \$14.79.

YELLOW JACKET—Produced 4849 tons of ore, yielding \$64,218 in bullion. Cost of extraction, \$56,156; transportation, \$4849; reduction, \$29,097; total cost, \$90,103; cost of production above yield, \$35,885; yield per ton, \$18.60.

The number of tons aggregated 63,109, which yielded bullion valued at \$342,439. The cost of production totaled \$1,022,884, and cost of production above the yield, \$180,445.

CALIFORNIA'S PARKS.—The effort of California State officials to have the Yosemite and Sequoia Parks of California policed by troops of the regular army have prevailed. General Gibbon's recommendation for a detail of Captain Wood's company of the Fourth Cavalry and Captain Dore's company of the same regiment for this duty has been approved by the Secretary of War. These two companies are now at the Presidio. The former is hooked for Yosemite Park and the latter for Sequoia. May 1st is the time set for taking up their station in these parks. Should any emergency arise in the meantime, requiring the presence of troops, General Gibbon has been authorized to call upon troops H and E at Fort Walls Walls and Vancouver Barracks, respectively.

THERE is a movement on foot for the establishment of a mining bureau in Seattle in connection with the Chamber of Commerce. The purpose of the Bureau is to furnish information regarding the different mining districts on Puget Sound and in Eastern Washington, and also to collect samples of gold, silver, lead, copper, iron, coal, asbestos, etc., for exhibition.

Amalgamation at the Comstock Lode.

A Historical Sketch of Milling Operations at Washoe and an Account of the Treatment of Tailings.

NUMBER VII.

[By A. D. Hodors, Jr. Read before the American Institute of Mining Engineers.]

IX. Discovery of the Tailings Process.

In 1862-63 Louis Janin was metallurgist of the Mexican mill at Empire City, where the ores were worked by wet-stamping and amalgamation in the batteries and in Mitchell's screw amalgamators. The tailings were dried, roasted in reverberatory furnaces, and amalgamated in barrels. Raw amalgamation in barrels was also tried—with partial success. In 1864, Janin was called to the old Gould and Curry mill. This establishment had made a failure with the Veatch process, which was thrown out that year, wet crushing and pan amalgamation being substituted. The mill had a large amount of tailings on hand, including slimes, which assayed as high as \$130 per ton, and blanket concentrations. The richest slimes were hauled to Franktown and amalgamated in Dall's mill by the barrel process. Janin put up experimental pans and worked the remaining tailings in various ways, generally trying to imitate the patio process. Experiments were also made in patio-yards, but these were a complete failure, while those carried out in pans were attended with a fair measure of success. They all indicated strongly the utility of bluestone and salt, but the full appreciation of these reagents was delayed by the difficulty of disposing, without very heavy discounts, of the heavy bluestone produced. Bankers were afraid of it, and everybody was trying to get fine bullion.

In 1866 the Gould and Curry Co., built the Reservoir mill, a short distance below its large quartz-mill, for the purpose of working its tailings. This was the first mill built expressly for the treatment of tailings, with the possible exception of one or two crude miniature establishments of sluice-owners in Six-Mile canyon. It had 14 flat-bottomed pans, and was operated by the Gould and Curry until that company went out of the milling business and, in 1870, sold it to Parke and Bowie, who enlarged it and named it the Railroad Mill.

Janin seems to have been confident of success as early as 1866, when he, with Charles Bonner and Ira S. Parke, built a large reservoir in Six-Mile canyon, a short distance below the Reservoir mill, to collect the tailings and slimes from both Six-Mile and Seven-Mile canyons. Within a year about 100,000 tons were collected, assaying from \$8 to \$24 per ton; and in September, 1867, Janin commenced to work the material in the Canyon Tailings-mill, which he had built near by for this purpose. The first runs were most encouraging, but a freshet in the following December swept away about half of the contents of the reservoir; and as the flood carried off the greater part of the rich slimes, from the treatment of which large profits were expected, the result was disheartening, although by no means disastrous.

The possession of a mill of his own enabled Janin to push his researches (which with the aid of subordinates, he had kept up constantly) with more independence than before. He tried various chemicals but always obtained the best results with sulphate of copper and salt, although these reagents produced a poorer amalgam, and, with the apparatus then used, the quicksilver was fouled and its consumption was large. Up to this time the usual method was to grind the pulp in small flat-bottomed pans, then thin it, and discharge it without settlers. Increasing the size of the pans and using settlers remedied in great measure the fouling and loss of quicksilver. Especial trouble was found in treating slimes which, when amalgamated fresh from the reservoirs, would remain in lumps in the pans, robbing the quicksilver and refusing to yield up the precious metals. But this difficulty was overcome by drying the slimes, the lumps then readily dissolving in the pans. The ever-varying quantity of gold and silver in the hatches worked, and the presence of amalgam caught with the tailings, augmented the troubles encountered in the experiments, by introducing an element of uncertainty as to the actual results obtained. Furthermore, the ores from the different mines did not work alike, the percentages of bullion-yield varying greatly under precisely the same conditions of treatment. Particular difficulty was found with the Obollar-Potosi slimes which, notwithstanding an excess of bluestone, produced only fine bullion. This result was attributed by some persons to decomposition of the bluestone by the oxide of manganese which was present in the ore. Others have thought that probably the injurious agent was an alkali or alkaline earth.

Henry Janin, having become financially interested with Louis, visited Washoe in 1868; and the two brothers (aided later by Alexis Janin) made a systematic, extensive and costly series of experiments, which thoroughly demonstrated the efficacy of bluestone and salt. Henry Janin came to the conclusion that dichloride of copper was the active reagent in the reduction of sulphurets of silver, and thought its direct use in the pans would be greatly superior to the use of salt and bluestone. He obtained a patent for this process; but the brothers never did more than experiment with the methods, con-

fining themselves to the question of the proper proportions of copper sulphate and salt. This question they solved to their satisfaction; and when they accepted the fact that base bullion was a necessity, and ceased trying to make fine bullion, their success was complete. They proceeded to secure slimes and tailings from all sources and to engage extensively in the business. They had apparently a fortune in their grasp. But it was impossible to keep their process secret; and when the ore supply from the mines became scarce and concentrated in the hands of a few millmen (as before described) all the mills began to save their tailings and slimes and to work them up for themselves. Moreover, other tailings-mills were built, and the competition became keen.

X. Development of the Tailings Business.

At the end of 1865 or the beginning of 1866, J. R. Andrews & Co. built large reservoirs on the flats at Dayton, and caught the tailings coming down Gold canyon. The amount collected here in 1869 was estimated at 400,000 tons, assaying from \$15 to \$30. Quite a large quantity was much richer, one reservoir, which was afterward purchased by Birdsall & Co., assaying about \$60. The mill here, a small establishment, originally built in 1864 to work ore, and known later as the Dayton reservoir mill, was purchased and started in the fall of 1866 by E. Wertheimer and Dr. Brerly, who sold out to Louis Janin and Leon Baldwin. This firm altered it, and put in five McCone pans, each holding 4000 to 5000 pounds of tailings to the charge, and treating four or five charges daily. Baldwin sold his interest to Janin, who, in 1871, tore down the old building and erected a new structure on the same site. The mill worked a part of the tailings collected in the Dayton reservoir; but the main portion of these passed into the possession of Birdsall & Co., and the Dayton reservoir mill finally was obliged to close down.

About 1867, Janin and Parke started a large reservoir on the banks of the Carson river, three miles from the mouth of Six-Mile canyon, the flow of water and tailings in this canyon being caught up and led in a ditch to the reservoir. At one time (about 1869) the contents of this reservoir were estimated at 200,000 tons. The quality was much poorer than that of the material impounded at sites nearer the stamp-mills. The average assay value was only \$7 or \$8, according to samples taken in 1875; but much poor material and even waste (brought down in seasons of abundant water) had been allowed to run in. No attempt to work the tailings here was made on a large scale until 1870, when the Carson Valley Tailings Company put up a mill with ten large Parke pans, holding eight tons to the charge. It was generally understood that the profits of the company were meager.

In 1869, Augustine of Silver City put up a mill with four large pans, on American Flat, to work the tailings from a reservoir below the old Bay State mill. This tailings-mill ran irregularly, and with results which were apparently unsatisfactory.

D. E. Avery had an establishment in Washoe valley called the Back Action (if I remember aright), which worked tailings on a small scale. It was built in 1866, and then had eight arrastras. Concerning this mill, I have only scant information. I imagine that it was not a great pecuniary success.

In Six-Mile canyon there were a number of mills, some of them curious little home-made affairs which worked blanket concentrates principally. Bassett's mill, originally built with 16 stamps, was using a barrel process for tailings in 1865, but was credited with six pans in the statistics of 1866. Jennings, Proctor, Evans and one or two others had establishments which ran more or less intermittently. Jennings, I think, outlasted the others.

The Atlanta mill, at Johnstown, in Gold canyon, erected in 1865 with ten stamps, was owned by W. Hill & Co., who altered it to a tailings-mill. In 1871 two large Parke pans, eight feet in diameter, were put in. The owners worked tailings for a number of years from a reservoir near by.

Not far from the last mill was the Keystone, built in 1865 with five stamps, and changed subsequently to work tailings. It was owned by Rulison and Lykens, who afterward moved it nearer Dayton. It was operated whenever pay material could be obtained.

Concerning the mill of Birdsall & Co. (afterward the Lyon Mining & Milling Co.), which was built originally for crushing ore, detailed information will be given in a subsequent part of this article.

Besides the tailings-mills above mentioned, quite a number of stamp-mills engaged in the tailings business when supplies of ore from the mines were unobtainable—as the Woodworth mill, on the Carson river at the foot of Daney canyon, where large amounts were treated.

The result of the increase in the number of mills working tailings was that in time rich tailings were not to be bought; even low-grade material was very difficult to get at paying prices, and the Janins were gradually forced out of the business. When they had retired there were only two large tailings companies in successful operation at the Comstock—Parke & Bowie in Six-Mile canyon, and the Lyon M. and M. Co. at Dayton.

Ira S. Parke and David Bowie owned two mills—the Railroad mill, formerly called the Reservoir mill, which they had bought from the Gould and Curry company in 1870; and the Canyon mill, which they purchased from Janin

about 1872, enlarging it and changing the name to Express mill. Parke was a good millwright and an able and energetic worker, who had learned the tailings business from the Janins. The firm secured large reserves of tailings, and operated for several years, apparently with great success. They did not, however, appreciate the importance of close assaying and of chemical studies, but sought only for improvements in mechanical details. They had no assay office connected with their mills—in this respect, however, merely following the usual Comstock custom—and were content to work without any exact knowledge of the values of the material which they treated, values which were varying constantly. Hence they had only hazy ideas of the accuracy of their work, and were liable to make (and did make) costly mistakes.

Parke was constantly changing the size and form of his pans and settlers, and seemed to have a mania for large pans. He undoubtedly introduced several improvements, but eventually overdid the thing. He increased the size of the pans to 6, 8 and 10 tons per charge, and in this his example was followed very generally. The extreme dimensions reached were 12 feet diameter by 8 feet high. Increasing the size was found beneficial to a certain extent, but the largest pans were complete failures. He then began to increase the number of millers in each pan. He invented a 2-muller pan which was 11 feet long, 5½ feet wide and 5 feet deep, held 5 ton charges and was provided with 2 settlers. At first the millers ran in opposite directions, later in the same direction. He had a 6 muller pan, also in the shape of a trough, but with very small millers. He built 3-muller and 4-muller pans. No one, so far as I know, copied these multiple-muller pans, nor was it easy to find out the exact results obtained with them, owing to the loose manner in which all the experiments were made. It was plain, however, that large motive-power was demanded, and that the construction was expensive.

In 1874 quicksilver had risen in price from 60 cents to (at least) \$1.30 per pound, and the price of silver had fallen greatly. This added essentially to the troubles of the tailings mills, which were then struggling with low-grade material, and proved fatal to Parke and Bowie, who accordingly failed. In fact all the tailings mills in Washoe, except the Lyon mill, closed down this year, some temporarily, others permanently; and none (with the exception noted) made any long runs thereafter. The Express and Railroad mills were sold. Ira Parke ran them subsequently for account of his creditors, but he died before long. His place was taken by his brother, Frank Parke, who a few years after died in the same manner as Ira—being run over by the steam cars. The success of the mills during these last years was very limited.

The best arranged, best equipped and most successfully conducted tailings mill ever operated was the Lyon mill at Dayton. This was built in 1865 by Birdsall and Carpenter to crush ore. Carpenter soon sold his interest to Birdsall, who was invited by Sharon to join the Union Mill Company, but declined. The mill then found it impossible to obtain adequate ore-supplies, although its charges for hauling and working were as low as \$8 per ton; and for several years it ran intermittently and without much profit.

When the treatment of tailings began to attract attention, George Langtry, a most energetic and able millwright, induced Birdsall to undertake this branch of the business. Birdsall owned land adjoining the Andrews property at the mouth of Gold canyon, and here Langtry put up concentrating apparatus, receiving in return a small interest in the mill, of which he was soon after made superintendent. When the Janine perfected their process, Langtry found out the details and copied them with success. In 1869 the company purchased the rich Andrews reservoir, added 20 pans to the mill and worked on a very large scale, at one time amalgamating 250 tons daily. But in order to keep up this rate of treatment, it was found necessary to work the slimes "green" from the reservoir, and the company gave up this wasteful procedure and reduced the daily amount treated to about 150 tons.

George Langtry was, all things considered, the best tailings-mill man of Washoe. He differed from the ordinary "practical" man in many respects, perhaps in none more remarkably than by recognizing and acknowledging the fact that his want of chemical knowledge was a serious deficiency. To remedy this deficiency, he sought always to have a capable metallurgist connected with the establishment. Under his management, and the subsequent guidance of his pupil, the Lyon mill achieved a success unparalleled in the history of tailings-mills. From 1869 to 1878, notwithstanding the decline in the value of the material worked and of the silver produced, and in spite of the great increase in the price of quicksilver, the mill steadily yielded large dividends. The company had a working capital sufficient for the purchase of large amounts of rich slimes and tailings whenever such came into the market. The mechanical skill and great executive ability of Langtry, supplemented by the chemical knowledge of his assistants, were sufficient to overcome each new difficulty in amalgamation as it arose, and enabled the mill to run on low-grade material which no other establishment could treat with profit. Thus, when the price of sulphate of copper was raised to an excessive height (it touched 24 or 26 cents per pound), the com-

pany's officers were found competent to put up and run acid chambers and bluestone works with such success that the mill obtained its own supplies at low figures, and large revenues were derived from sales to others. When the discount on base bullion reached 27 per cent in 1874, a process for refining this bullion was promptly devised, whereby not only were fine silver and fine dore bars turned out, reducing the discounts, but also, through the recovery of the copper previously lost, in the place of additional expenses, additional profits ensued. This process, it may be noted, solving the difficulty which so long delayed the financial success of the Janin brothers, rendered their method practically complete. Moreover, as no one else ever succeeded in refining bullion so rich in copper, other mills sent their product to the Dayton refinery, to the financial advantage of the Lyon mill.

Langtry died in harness in 1875, but so long as his methods prevailed the mill was operated with financial success, and although the tailings treated sank in assay value to about \$5 per ton, it was found possible to earn and pay continuous dividends. But when his pupil resigned in 1878, and a new management imbued with radically different ideas was established, dividends became painfully rare.

In 1877 the bonanza firm built their large tailings-mill on the site of the old Gould and Curry mill. It was the last successful mill of the kind erected at the Comstock, and was appropriately named the Omega. It had a daily capacity of about 170 tons and ran a number of years on slimes and tailings from the Consolidated Virginia and California ores. It was provided with a couple of long-cylinder furnaces for drying the slimes, and with a refinery, built in 1878 after the plans of the one at Dayton. It was operated successfully, I am told, until it exhausted its supplies.

Early in the eighties a small mill was built by Conrad Wiegand and others, east of Virginia City, near the railroad tunnel. It was erected after my departure from Washoe, and I have no detailed information concerning it. The intention was to work the tailings of the old Lynch reservoir, which were supposed to be very rich. These tailings had been offered previously to the Lyon mill, which sampled and assayed them, finding the material to average only about \$6, if I remember correctly. The Lyon mill gave its assay results to the owners, who refused to believe the figures. Conrad Wiegand, the well-known assayer, made some assays, obtaining much higher results, and put about all the capital he had into the company which built the mill. I have been told by a person who was connected with the establishment that the mill runs verified the Lyon mill assays, and that the mill was a complete failure from the start. This failure is supposed to have been one of the principal causes of poor Wiegand's tragic death.

(To Be Continued.)

MANUFACTURING ESTABLISHMENTS INCREASE. According to J. H. Gilmore, special agent for the collection of census returns in this city relating to manufactures, the work here will be completed in a very short time. Strict secrecy is maintained by him as to the statistics contained in the schedules, the last of which will be in within two weeks. Four thousand two hundred schedules have already been forwarded to the Census Bureau in Washington. Before being forwarded all the details called for were carefully looked up and the returns well scanned. Although Agent Gilmore and his deputies will not furnish any information, it has been gathered from the returns for the tenth census and the returns already filed during this census that there were over 1300 more manufacturing establishments in this city in 1890 than existed in 1880—a very notable increase.

THE ELECTRICAL ADHESION QUESTION.—The reality of electrical adhesion and of making a practical use of it in operating railroad trains is still under discussion among engineers, with the odds in favor of the affirmative. It is claimed that adhesion is clearly manifested even when the rails are covered with water or oil. The advantages which it is thought may be derived therefrom are claimed to be manifold. It would seem to be a matter of ready proof whether there is anything in it or not. The philosophy of the principle, if it exists, is thought to be in a slight heating and consequent softening of the surfaces of both wheels and rails. It is well known that even a weak current of electricity produces a great heat upon the surface of iron when passed over it.

THE Senate has passed a bill which requires that every corporation doing business in this State is to pay mechanics and laborers employed the wages earned by and due them weekly (or monthly) on each day in each week (or month) as shall be selected by said corporation. A violation of the Act shall entitle each of the said mechanics and laborers to a lien on all the property of the corporation for the amount of their wages, which lien shall take preference over all other liens, except duly recorded mortgages and deeds of trust.

THE Northern Pacific Smelting Works, four miles from the city of Spokane Falls, have been completed and are ready to start. The capacity is from 150 to 200 tons per day.

THE demand in the East for Utah asphaltum is very great, and the company has been unable to obtain cars enough to meet the demand.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

RICH STRIKE.—*Ledger*, Feb. 20: S. W. Bright has had two or three men working on his claim in the slaughter-house field for some time. They have sunk a shaft 40 feet deep, besides running a tunnel into the side hill. It has always been looked upon as a very promising prospect, the ore body being large and yielding a good prospect. On Wednesday night, however, they struck quartz of an immensely rich character. Mr. Bright showed us a specimen weighing about two pounds, which is plentifully sprinkled with coarse gold. Such ore would surrender many hundreds of dollars to the ton. There is said to be a well-defined ledge from 6 to 16 feet wide, a large portion of it showing more or less free gold. The general character of the rock, outside of the free gold, is very similar to the Zeile ore. It is not a pockety nature, as it carries a heavy percentage of sulphurets. The claim is known as the Bell Wether mine, and is not more than half a mile east of Jackson.

BELMONT MINE.—The newly-organized company is now under good headway. One thousand feet of steel T rail has arrived at the mine and will be laid in the open cut and the company's 10-stamp mill started on surface ore. On the 160-foot level work will be carried on in a northeasterly direction.

MISCELLANEOUS.—The crushing of the ore from the Pioneer mine, at the Zeile mill, did not pan out well. The yield fell below a paying figure. The owners, however, are not much disappointed at the result, as it was merely surface rock, and pay-ore was not met with in the Kennedy mine adjoining until 800 or 900 feet was reached. The Zeile is running to its full capacity again. During the long spell of partial suspension of the mill, owing to repairs to the shaft, the sulphurets worked cleaned up the entire pile of sulphurets which had accumulated. It is reported that the mill of the Amador gold mine will be used for a test crushing of ore from the De Witt tunnel in Hunt's gulch.

A NEW MILL.—*Amador Dispatch*, Feb. 21: Recent tests of rock from the old Casco, or Hardenbergh mine, have proven very satisfactory to the owners, and we understand that Mr. J. B. White is up from San Francisco for the purpose of making the necessary arrangements for putting up a 10 or 20 stamp mill on the premises as soon as possible.

Butte.

THE GOLDEN GATE DAM.—*Oroville Mercury*, Feb. 20: It gives us pleasure to chronicle the fact that the great dam of the Golden Gate mine stood as firm as the rocks adjoining it during the very high water of the past few days. Being in the main Feather, at a point where the accumulated waters come rushing from all the old branches of the Feather and from a thousand tributaries that drain hundreds of miles of the Sierras, many people feared disastrous consequences. Col. McLaughlin never for a moment lost faith in his work. Now, as the flood has gone on to the sea and the dam remains, the work can truthfully be pronounced the best ever done in California mining, as never before has a dam on the Feather withstood the floods of winter. Those who saw the river at the mine on Sunday afternoon and Monday morning, say it was a grand sight. The vast body of the river came surging down the canyon and rolled over the dam upon the rocks below, producing the splashing foam and thunder of Niagara. When the waters subsided, it was gratifying to see the dam firm in its place and without injury.

El Dorado.

ELECTRICITY AND MINING.—*Mountain Democrat*, Feb. 21: Wm. Husband, of the Delmatia mine, Kelsey, was in town during the week. Mr. Husband had seldom gets in to see us these days, as he is in charge of the electrical works on the mine, and the continued successful working of this mine requires his constant attention. But few of our citizens realize that this mine is the most successful enterprise in our county, and that it is demonstrating the worth of El Dorado county mines, if judiciously managed.

PACIFIC.—The Pacific management are doing a large amount of work on the various claims under their control, and are bound to find and open out the mineral bodies in their extensive holdings, and the indications are that the work will be justified by the developments.

KELSEY.—*Georgetown Gazette*, Feb. 19: Several of our placer miners made early preparations to work their claims, but owing to the mild winter they are still idle.

GEORGETOWN.—No matter what the impression is abroad, miners hereabouts are confident that this is soon to become a lively mining camp. A number of the right sort of men are already looking into some of our propositions with much favor, and active development of two more properties in this district is already assured to soon begin.

FRENCH CREEK.—*El Dorado Republican*, Feb. 19: Turnbow Brothers and M. D. Brandon have been opening their mine. They have run a tunnel which tapped the ledge about 50 feet from the top, the work showing a 20-foot ledge.

Calaveras.

AROUND MURPHYS.—*Cor. Calaveras Prospect*, Feb. 21: Mining operations in this region are being pursued systematically, and to all appearances everything is in a fair state of development. Thus far this season, but little outside prospecting has been done. The argument of "slate vs. lime" is one frequently heard and is one of consideration. Most old miners of experience affirm that the prospecting must be done out of the limestone belt, either above or below or good and defined ledges. Limestone possesses some good quartz, but in irregular masses without walls or absolute system. The region of Forrester's ranch and beyond, east of this place, is virtually in its incipency in the prospecting line. Years ago some flatteringly rich rock was found there and strange to say, but little work has ever been done to discover the fountain head of the pay ore. James Taylor, a prospector of years, found at one time some splendid ore as far up nearly as Avery, but claims he could never find the lode. The Stanislaus district is still maintaining its celebrity as a mineral belt, and several good dis-

coveries have lately been made there. Taylor & Sibels mine, found a short time ago, gives great promise, and it is expected good reports will follow. Echo Placer mine is in new hands at present, and under the direction of Mr. Frost, who is pursuing the work upon the property in an energetic way. Carley Bros. at Old French Camp are "on the track" of a pocket, several of these splendid "mining objects" having been found there in years past, and being in the belt of the famous John Gamble mine from which \$16,000 were extracted in a short time. Will Carley had on exhibition last Sunday a handful of beautiful specimens of pocket quartz filled with large chips, that made one's eyes dazzle with their richness and splendor. The only trick is to find the gold by the tuff.

WEST POINT.—*Cor. Calaveras Chronicle*, Feb. 21: The town has been in a state of apathy for some time, but at present the outlook is much brighter. Business has been dull since the holidays. Owing to the "jack-in-the-box" system of paying men that some of the mines hereabout have adopted, money is very scarce, and many miners, rather than take 60 or 75 cents on a dollar for their pay, have quit the mines and gone to prospecting. At no time for years have there been so many prospectors hunting for paying leads. In the spring there will undoubtedly be some good cleanups by the prospectors. The Bleeding Steer mine is looming up again and has a big crew of wood-choppers at work. Capt. Tibbe of the Smith mine is putting up new hoisting works and machinery on his property. The knowing ones say the Captain has a good thing.

Inyo.

MODOCK MINES.—*Independent*, Feb. 20: Mr. Frank Fitzgerald reports that the value of ore sold from the Modock mines during January was \$4470. The three 8-hour shifts are driving a tunnel to cut a body of ore in the Argus shaft. A new prospect in the Black Warrior mine is turning out one ton of high-grade ore per day. Mr. Fitzgerald has 22 men employed at present. There is a postoffice at the camp and mails are delivered regularly; a large and comfortable reading-room is provided and well supplied with newspapers and other reading matter. There is abundance of good water and every facility afforded for the men to be clean and comfortable.

REDDING CANYON.—*Register*, Feb. 19: The Hill & Anderson claims in Redding Canyon are said to be developing in most satisfactory shape. In the Georgia the ledge has widened to eight inches of high-grade ore, with a downward pitch. The work in the Enterprise shows a chimney estimated to contain 100 tons of rock of which the lowest assays exceed \$100, and it is believed the ore to smelt to, if not above this figure.

Mono.

PATTERSON MINING DISTRICT.—*Chronicle-Union*, Feb. 14: Patterson to the front! The Homestake mine, owned by A. P. Sayre, has a three-foot ledge of good ore. Mr. Sayre has some 50 tons of \$60 ore on the dump, and 1½ tons, that will mill \$1000, which he will ship to San Francisco. Some time ago he shipped 3000 pounds, which netted him over \$400, but the present strike is much richer, and is 50 feet lower down, in the tunnel run south from the bottom of Silverado Canyon. It is a good feature in this mine that it is in the bottom of a canyon and nearly 2000 feet from the top of the mountain in which the Kentucky is situated and is supposed to be on the same ledge. This is better than to find a mine on top of a ridge, which is too often a surface lode, like a wedge. Thomas C. Sharp is taking out ore from the old workings of the Thoroghrace mine for a run in the Monte Cristo mill. John H. Sheehan is working three men in the lower tunnel of the Kentucky to tap three bodies of ore above. Some of these are very rich, going into the thousands. It is all virgin ground. The Monte Cristo has started up again after a short shut-down. It looks better now than ever. R. T. Sorenson will soon commence work on the Theodore, which is on the same ledge as the Thoroghrace. As a whole, the prospects of this district were never so flattering as now. The discovery in the Homestake of richer ore in the lower tunnel is convincing as to the existence of permanent and defined mineral-bearing ledges in that section of Mono county.

Nevada.

STRUCK RICH GRAVEL.—*Transcript*, Feb. 20: For three years past Dan Cole, H. F. Briggs, Wm. Byington, A. Busch, Geo. Gale and other prominent citizens of Sierra county have been prospecting the Golden Giant and other drift claims on the ridge a mile above Nigger Tent. Day before yesterday they struck, in a tunnel which they have put in about 1500 feet, gravel that pays \$4 a carload. They have the ledge located for a distance of about two miles. San Juan and Bloomfield parties are prospecting on the same ridge and this side of the Golden Giant. They are running a tunnel to strike gravel they found last year by sinking.

NORTH STAR.—*Tidings*, Feb. 20: Work in the main shaft has been continued with great activity during the past six months. In the three months (Sept., Oct. and Nov.) the shaft was sunk 77 feet, attaining an increased depth of 124 feet from June to December, working ten-hour shifts with power drills. Sinking will be resumed immediately on contract. Many changes have also been made to facilitate deeper mining and perfect the line of pumps in use. At the 1400, 1700 and 2000 levels, 16, 12 and 10-inch plungers have been placed. New 12-inch column pipe has been laid from the 1400 to the 1700 and new 8x10 inch rods connected from the 1400 station to the 2000 station. A 16-inch plunger at the 500 and an 8-inch lift at the 2100 completes the system of five pumps used at the North Star mine. The very favorable winter has made the many improvements possible without any stoppage to the mill or diminution of quartz supply. Connections will shortly be made in the 2000 stope and drifting commenced on the 2100 level. In the 1900 level a large body of ore is being opened, stoping continuing in the 1600, 1700 and 1800 levels. The year 1891, so auspiciously opened, promises well for a large and profitable output.

Shasta.

GOOD QUARTZ.—*Redding Free Press*, Feb. 21: Harrison, Lyons and Meeks have struck good quartz in Quartz hill. They have a tunnel about 120 feet long, and come into a horse of broken formation. The quartz prospects well. They will go through the ledge which is thought to be at least 20 feet wide. Fred Grotefeld visited the Texas & Georgia and Calumet mines this week and was delighted

with what he saw. Fred thinks that the Old Diggings is the coming camp. The recent developments in the Texas & Georgia place that mine in the front ranks of mines in this county, and the rich vein discovered still shows up well. At the Calumet Mr. Paul has 25 arastras going day and night; there is an abundance of ore and everything is going along satisfactorily.

Sierra.

STRUCK PAY.—*Mountain Messenger*, Feb. 21: George Gale was in town Thursday, and reports that he has found good pay gravel in the Golden Giant claim, located on the ridge below the Mountain House. The company has been running a tunnel for the past two years or so, and last year put in an air compressor and machinery. This find insures that the channel follows the ridge down to Yuba county and renders certain the value of a large number of claims. The gravel was found in an upraise about 170 feet perpendicularly above the main tunnel. Not enough work has yet been done at the top to determine the exact lay of the lead. The gravel and gold both show it to be high on the rim. Prospecting is being pushed to secure data upon which to push the main tunnel into the channel.

Tulare.

MINERAL KING.—*Tulare Times*, Feb. 19: There is a prospect of work being resumed in the Mineral King mining district soon. An English company has relocated a number of claims there for the purpose of developing them, and it is to be hoped that a big bonanza will be uncovered there. There is no doubt but what the veins of this district contain both silver and gold in paying quantities, but the trouble is the ores have proven to be very rebellious.

Yuba.

SMARTSVILLE.—*Grass Valley Tidings*, Feb. 19: Smartsville, in Yuba and just over the border of Nevada county, is now one of the liveliest camps in the State. The late citrus fair at Marysville did much to advertise the capabilities of this old mining camp, where thousands of dollars have been extracted from Mother Earth. A great many parties have ordered small numbers of orange and lemon trees for planting, and soon the gardens of the miners will be as rich with the golden fruit as the mines are with the real simon-pure material. Three mines are at present being successfully worked in the vicinity of Smartsville. The Deer Creek mine, of which H. B. Wheaton is superintendent, is looking well and dividends are regularly declared to the stockholders. The Blue Point is also one of the paying mines of Smartsville district. At the Ayer mine drifting is being pushed as rapidly as possible. A shaft has been sunk to a depth of 72 feet. Fifty men are employed at regular wages. W. J. Stewart is the superintendent and Will Grant of Rough and Ready foreman. This mine is owned principally by J. C. Ayer & Co., of Sarsaparilla fame. The company have in contemplation extensive improvements, which if completed will enable the mine to be worked successfully for many years. Arastras are used at all the mines, they having been found more serviceable than stamp-mills for crushing the cement. The pebbles are not crushed but simply ground, the gold adhering to the outside. Each mine has three arastras, with a capacity of about 70 tons in 24 hours. The arastras are kept running night and day, being charged about every two and one-half hours. A charge is about a ton of gravel or cement. Boulders are very plentiful, constituting about 65 per cent of the gravel. Pelton wheels are used to run the arastras. The Ayer mine was formerly the property of the Excelsior Co. If the contemplated improvements are made by the Ayer Co., Smartsville will have a boom, both in the mining and fruit-raising industries.

NEVADA.

Washoe District.

JUSTICE.—*Virginia Enterprise*, Feb. 21: The north drift on the 822 level is out 328 feet. The face is in hard ground. The south drift from No. 1 winze, 490 level, is out 139 feet. The face is in fair-grade ore. Shipped to the mill during the week 190 tons. Average battery assay \$17.27 per ton.

KENTUCK.—Have advanced raise in the east ledge, 1000 level, 7 feet; total height, 28 feet; top is all quartz of low grade on the average, but containing spots of ore. The north drift on this level was advanced 15 feet, making its total length from the east crosscut 400 feet; face in a mixture of porphyry and low-grade quartz. Started north drift from raise in the west ledge on this level on the second floor, which is now out nine feet; face in quartz containing stringers of ore, some of which we are able to save for pay.

SAVAGE.—During the week we have hoisted 596 carloads of ore from the 400, 500, 750, and 1300 levels. Shipped to the Mexican mill 512 tons and milled 590 tons of ore; the average battery assay of which was \$14.10 a ton; bullion on hand amounting to about \$12,665.40. No. 1 east crosscut from the southeast drift, 1300 level, from the Savage shaft, was advanced 17 feet; total, 168 feet. Last Thursday night quite an unexpected heavy flow of hot water broke in from the face of this drift, which has temporarily interrupted work in its face. At a point in the winze, 75 feet below the 1300 level, we have finished the station for the intermediate level and have started north and south drifts therefrom. Both drifts are in quartz showing bunches of good ore.

YELLOW JACKET.—Shipping 40 tons daily of ore worth \$19 a ton, as per battery samples, to the Brunswick mill and doing extensive prospecting work throughout the mine.

BENTON.—\$79,000 in the treasury. **CONFIDENCE.**—The joint Confidence and Challenge west crosscut from north drift on the 1100 level is out 179 feet, 24 feet having been added during the week, the face showing porphyry.

CHALLENGE.—East crosscut from the 300 level is out 50 feet, 13 feet having been added during the week; face in quartz of no value.

CON IMPERIAL.—The work of following up and taking out small streaks of ore on the upper levels and overhauling the old stopes of the mine is still being carried on.

OVERMAN.—Extracted 422 tons and 800 pounds of ore. Car samples average \$14.23. Shipped to the Brunswick mill 427 tons of ore; battery samples average \$15.31 per ton. On the 1100 level the incline upraise from the northwest drift has been extended 17 feet through porphyry and quartz; total length, 164 feet. Incline upraise from south drift

has been extended 14 feet through ore of a fair grade. Total length, 179 feet. On the 1200 level upraise on northeast drift has been connected with the 1100 level.

CROWN POINT.—The west drift on the 500 level has been advanced 25 feet since last report, making its total length 67 feet. The face is in soft porphyry with little water seeping from it. The repairs on the 600 level are progressing rapidly. Are still extracting a few cars of ore per day from the 1300 stopes.

BELCHER.—No. 3 west crosscut, 300 level, west ledge, is out a total distance of 77 feet, having been advanced 37 feet since last report. The face is in porphyry and low-grade quartz. The 1400 level east crosscut is advanced 21 feet and is out a total distance of 57 feet. The face is in quartz assaying from \$2 to \$5 a ton.

SEG. BELCHER.—The east crosscut from the south lateral drift on the 600 level is out a distance of 47 feet, having been advanced 31 feet during the week. The face is in a mixture of porphyry and clay.

HALE & NORCROSS.—On the 900 level the west crosscut on our north boundary line was advanced 25 feet, making its total distance 210 feet. The face of this drift has reached the west clay wall of the vein and has been discontinued. On the 1100 level the east crosscut on our north boundary line was advanced 20 feet; the face is in low-grade quartz mixed with porphyry. No. 1 west crosscut, started 60 feet north from the 1400 level station, was advanced 105 feet, having been extended 20 feet since last report. No. 2 west crosscut started from the south lateral drift 55 feet south from the station is extended 85 feet, having been advanced 20 feet during the week. No. 1 west crosscut is advanced 45 feet. This crosscut continues in quartz giving low assays. No. 2 east crosscut started 60 feet north of the 1400 level station was extended 15 feet, making its total length 100 feet. No. 3 east crosscut is advanced 40 feet. In the south lateral drift at a point 75 feet south of No. 2 west crosscut we have started No. 4 east crosscut and advanced the same 10 feet. All these crosscuts are passing through favorable looking vein material, but disclose nothing yet of practical value. We are repairing the main incline below the station on the 1400 and are putting waste and ore chutes below the station for this level.

SIERRA NEVADA.—650 level: The northwest drift has been extended 36 feet; total length, 557 feet; formation, porphyry.

OCCIDENTAL.—At a point in No. 3 upraise 40 feet below the track floor of the 450 level, have started a south lateral drift in ore of good quality. The south drift from the bottom of No. 5 winze is showing some quartz with bunches of fair ore.

CHOLLAR.—Winze 80 feet south of north line, 750 level, is down 80 feet, bottom in clay, quartz and porphyry. Are opening a station in the main incline on the 1100 level. Sent to mill the past week 550 tons of ore, the value of which averaged \$18.42 a ton, as per battery samples.

POTOSI.—East crosscut from winze, 930 level, is out 78 feet in porphyry streaked with quartz. East crosscut 350 feet south of Chollar incline, 1230 level, is out 157 feet; face in porphyry and streaks of quartz. South lateral drift, 1300 level, is out 667 feet; face in clay and porphyry.

WARD COMBINATION.—East drift from the 1800 station is out 825 feet; formation clay and porphyry.

ALPHA & EXCHEQUER.—No work done the past week on account of repairs to shaft.

SILVER HILL.—Are opening out the 50 level.

UTAH.—On the 725 level the northwest lateral drift from the main west drift from the shaft has been extended 10 feet; total length, 428 feet. West crosscut No. 2, 150 feet northwesterly from west crosscut No. 1, has been extended 40 feet, total length, 75 feet, passing through vein porphyry, clay and fine lines of quartz. Face of crosscut is in west country formation.

ANDES.—During the past week north drift, 420 level, was advanced 15 feet in a formation of quartz and porphyry. Work in east crosscut has been suspended for the present. Have cleared out and timbered north winze from 350 level and started sinking the winze to connect with the main north drift on 420 level.

GOULD & CURRY.—200 level: Winze No. 1 has been sunk 8 feet; total, 14 feet. We have extracted from this level during the week 35 cars of ore of fair quality. 250 level: South drift from upraise No. 1 has been extended 31 feet, passing through quartz and porphyry. West crosscut No. 1 from upraise has been advanced 30 feet through quartz and porphyry; total length, 80 feet. 300 level: Incline upraise No. 1 has been carried up 23 feet; total, 120 feet. Face in porphyry and bunches of quartz.

BEST & BELCHER.—1200 level: West crosscut No. 1 has been advanced 17 feet through porphyry, clay and bunches of quartz; total length, 125 feet.

Potosi District.

RICHMOND.—*Silver State*, Feb. 20: Wm. Farrell, of the Richmond mine, Potosi District, Osorno Range, paid our office a visit this morning. He reports the mine looking exceedingly well, with plenty of average grade ore in sight.

COLORADO.

HIGH GRADE ORES.—*Denver News*, Feb. 19: The mine-owners are confronted with a very complex and serious question at present, involving the disposition of their high grade ores. It must not be assumed that the ore cannot be sold, but all sales made for a long time were at a sacrifice. In truth the smelters don't want the ore that runs from \$75 to \$500 per ton, and it would make the face of a smelter-owner turn white to speak of selling him ore that is worth \$500 to \$75,000 a ton. There is not a little of this ore being mined in Colorado to-day and nine-tenths of it is to-day stored in the ore-houses. This is especially true of the mines in the Silverton and Ouray district. There is so much fluctuation in the price of silver and so much danger of loss in the treatment of high grade ores that the smelters in many cases will not bid on them, except at such figures as the mine-owners would not listen to. They remember the two carloads of Yankee Boy ore, worth \$40,000 each, that stood on the sidetrack in the switch yards for weeks before any one would dare to bid. The sale of such ores is now causing the mining men no little worry. The prospects of free coinage appear very blue and it begins to look, unless the measure passes, there will be no relief for the miners, and some of the mines will have to close.

ASPEN NOTES.—*Times*, Feb. 21: Carl Wulstien has

leased the Rip Van Winkle on Richmond hill, adjoining the Phoenix, just south of Queen's gulch. B. Clark Wheeler has sold his interest in the lease and bond on the Gen mine to Mrs. Cora E. Russell, who is the pioneer woman of Pitkin county. The lease runs until July 14, 1892. Cora E. Russell has sold her 1-16th interest in the lease and bond on the Wilmington, Picnic and Idlewild of the Climax group to B. Clark Wheeler. Toney Nugent has a sixteenth and Wheeler the balance. Nugent is superintendent and head drill pumper with three helpers, at a salary of \$100. Wheeler is manager and paymaster with a salary of \$75. John Thorne is pushing work on the Austin lease. Two men are employed on the Aspen Con. tunnel. Supt. Besser of the Highland Chief M. Co. reports that he has caught the contact on the Lackawanna Boy, and that the ore is rapidly improving on the Chief; 40-ounce assays are obtained. The company is preparing to patent its Pyramid claim.

LEADVILLE MINES.—Cor. *Denver News*, Feb. 19: The mining industry in this section has shown marked activity during the past few weeks. The Moyer started up last Friday, running two shifts, with a force of about 140 men. This property is a regular shipper, and is producing some good ore. William S. Patrick is shipping some first-class ore from the Slipper Rock hill. The shipments will aggregate nearly 100 tons per month. Prospect work on the Manning lease is progressing favorably. The returns are very encouraging. The McGarey lease on the Oro City is shipping regularly. The ore is improving in quality and quantity. After a long siege of prospect work a small streak of rich ore was encountered last week at the Satellite. The streak is being followed, but as yet has shown no signs of widening. A large body of ore was recently struck in an upraise at the La Plata on Rock hill. An old winze has been timbered, down which the ore will be lowered and taken to the surface, through the old La Plata shaft. This property, until recently, has failed to pay expenses, but under the management of Philip Aragall is rapidly coming to the front. The Redhead, adjoining the La Plata and under the same management, is shipping about 25 tons of good lead ore per day. The Blind Tom lease is producing some very rich ore, which is being sacked and placed in ore sheds. This property is now working two shifts, and will begin shipping in a few days. Leadville parties interested in mining property near Granite returned from there last night and report a curious state of affairs existing at the Mayflower. The property is being worked by Denver parties under bond. Six men are employed underground to each shift. The shaft is down about 110 feet. Drifts in either direction are being run in on a fine streak of rich gold ore, which is sorted and sacked. Were this property backed by the requisite amount of brains and capital it would undoubtedly prove to be one of the most valuable of recent gold discoveries in this section. The Dunkin No. 2 is shipping regularly a large amount of low-grade iron ore. Some fine ore is being taken out at the Foster lease on the Dome. Prospect work is progressing rapidly, and the returns are very favorable. Mr. M. Hurly, working the Baby shaft in the Stone, under a lease, is shipping regularly. Connections will be made with the Baby and another shaft farther down the hill in a few days in order to facilitate the hoisting of ore. Considerable deadwork is going on at the Big Chief in clearing away the debris of the fire in that property some time ago. The Elk is shipping something over 100 tons of ore regularly. The bodies from which this is taken seem to be almost inexhaustible.

DAKOTA.

D. & D. SMELTER.—*Deadwood Pioneer*, Feb. 21: The work on the new smelter will hereafter be pushed with the utmost vigor. The death of Mr. Miller left Prof. Carpenter somewhat doubtful of the company's intentions, but on Messrs. Swift's arrival they directed him to proceed with the work as rapidly as possible. One-half of the smelter, of 125 tons capacity is expected to be completed by June 1, and the other 125-ton building will be added before the first of next year. The machinery was to have been shipped on the 20th of this month, but the building was not far enough advanced to receive it, and Prof. Carpenter ordered the shipment postponed for a few weeks.

ANOTHER TIN-MILL.—Col. O. O. Taylor, of St. Paul, who has acquired title to a number of valuable Nigger Hill tin claims, has decided to erect a mill and concentrator, and has already purchased a portion and contracted for the remainder. The colonel also owns a millsite, with water right and plenty of good timber. He has had considerable experience in tin-mines and has no hesitation in saying that the Nigger Hill claims are the richest he ever saw in any country. This enterprise will be watched with a deep interest and its success will lead to the establishment of other and larger works.

TORNADO.—Shipments of ore are being daily made from the Tornado, at Ruby, and the mine is looking splendid.

MARK TWAIN.—This property is at the head of Nevada gulch, and is owned by E. May, of Lead. Recent developments on the property have uncovered a large body of ore that will pay to ship, and shipments are now being made to Omaha.

KROJAN.—The ore in this mine is of a high grade, and a large body is in sight. Shipments are now being made, and the quantity is only limited by the railroad facilities.

IDAHO.

TRADE DOLLAR.—*Idaho Avalanche*, Feb. 20: The tunnel No. 2 on the Trade Dollar is still progressing favorably and in rich ore. The ledge at the present face is 18 inches wide and rich, yielding considerable fine specimen ore. The face of the tunnel is still 235 feet away from the winze which it is running to meet. When they are connected the ground will be in fine shape for stopping the rich chimney cut in tunnel No. 1. The Idaho Pittsburg Company is now stopping out ore on the ledge on which it has been drifting and has again started the Rand drill on the face of the crosscut tunnel which will be pushed farther into the mountain with the expectation of cutting other ledges. The pay streak in the ledge where the stopping is being done is about ten inches wide with 600 feet of backs, all virgin ground above.

THE DE LAMAR DEAL.—*Idaho Avalanche*, Feb. 21: The contract for the sale of an interest in the

De Lamar property being now a matter of record, *Avalanche* is prepared to give its readers a correct synopsis of the terms and conditions of the biggest deal made in Idaho mining property for a long time past. Told as briefly as practicable, the contract is as follows: Captain De Lamar turns over his entire property, consisting of all his mining claims, mill, millsite, water rights, ore on hand and not in transit on day of transfer, all buildings, timbers and supplies on hand May 14, 1891, to the promoters of an English stock company, the transfer to be made on the 14th day of May, at a nominal price of \$2,000,000, in consideration of which the buyers agree to pay him not less than \$500,000 or more than \$750,000 in cash for their interest and to stock the mine in Great Britain at \$2,500,000, \$400,000 working capital. Of this \$400,000 working capital, \$250,000 is to be paid in cash by the promoters and the balance, \$150,000, in stock subscriptions at par value. Then Captain De Lamar is to receive balance of amount to be paid him in stock at cost value sufficient to make his total payments \$1,750,000. But by paying Captain De Lamar \$10,000 within 30 days from date of contract, the promoters have the privilege of fixing the capital stock at only \$2,000,000 and the working capital at \$225,000, in which event \$175,000 must be paid into the treasury in cash and the balance of \$50,000 raised from stock subscriptions. De Lamar still receiving the same amounts in cash and the same amount in stock at cost as in the first-named proposition. Either of the above propositions boiled down means that the promoters purchase at the rate of \$2,000,000 for the whole, either one-fourth or three-eighths of the property, Captain De Lamar still retaining the larger interest and control and receiving either \$500,000 or \$750,000 in cash, according to whichever proposition the promoters may choose to take. The contract is signed by Henry Bratenober of Helena, Montana, for the purchasers, and we are informed that the English capitalists investing are the same who brought out the Elkhorn mine of Montana, in London, the stock of which is now 75 per cent above par. It is understood that the English capitalists interested in this deal propose to take all the stock not going to De Lamar, themselves, and that it will not be put on the market at par.

LOWER CALIFORNIA.

ALAMO.—*Lower Californian*, Feb. 19: The Indian mine is being developed faster than any mine in Alamo. The Burleigh steam drill is the cause of this. Shots are touched off continually, sometimes as many as eight a day. This means a great activity. The Ushes mine is going ahead pretty lively, sinking. Water is plentiful, but not enough to stop work. The Aurora is being worked night and day, sinking and drifting. The body of ore has come in in both places, and some of it richer than ever. D. W. Church is foreman of the El Paso and work is progressing very favorably on the mine. The Gold Tree mine has been opened by the Princess Co. and fine ore is in sight. The mine is being pumped out. The San David is almost ready to begin active work.

MONTANA.

SHONBAR.—*Butte Miner*, Feb. 19: Developments in the Shonbar company's ground, which lies just south of the city and adjoins the Bannister ground on the east, are progressing rapidly and are exposing some fine ore. This ore will assay from 300 to 1000 ounces in silver, from one to three ounces in gold per ton, and from two to five per cent copper. The property is at present looking remarkably well and will no doubt become a rival in production to the great Vulcan or Bannister, adjoining it on the west.

BANNISTER.—With reference to the Bannister, the company declared on Wednesday, the 11th, its sixth dividend of \$6000, payable on the 25th at the office of the company at Helena, making \$36,000 paid since last August. The workings of the mine are looking fine and the ore bodies promise as large returns in future as they have in the past.

THE BI-METALLIC.—*Phillipsburg Mail*, Feb. 19: During the past few days the Bi-Metallic company have been contemplating putting on a large force of men, excavating for the additional 50 stamps which they are to erect alongside of the present mill, but the disagreeable weather has so far prevented them from beginning operations. This addition to the milling capacity will mean the employment of a larger number of men at the mine and mill, to say nothing of those who will be required in its construction. Of course this is an assurance of greater prosperity for Flint Creek district, and means a great deal to Phillipsburg. Certainly not less than 50 or 60 hands will be steadily employed in operating the new mill, furnishing fuel, etc., and in a short time the Bi-Metallic will be a marvel in its productive and dividend-paying qualifications.

A BIG DEAL.—*Butte Miner*, Feb. 12: The big mining deal which has been pending in the city during the last month, mention of which has been made exclusively by the *Miner* on several occasions, assumed formidable shape yesterday, and the transfer is now as good as consummated. The mines to change ownership are the Amy and Silversmith, owned by a company and located just northwest of the Moulton; the Goldsmith, owned by George Tong exclusively; the Millside, owned by Frank Carey et al.; Little Annie, owned by Clayton Ramsdell of Deer Lodge; Tully, owned by John Connell and D. J. Hennessy; Sooner, owned by E. A. Nichols and Charles S. Warren, and the Silver Safe, owned by Patsy Clark and others. All of these claims are situated northwest of the Moulton, and have long been considered among the best silver-producers in the camp. The purchasers are an English syndicate represented by A. E. Barton of this city and the price agreed upon is \$800,000 in cash. The deeds for the transfer of the property have all been made out in the name of Frank P. Carey, signed by the claim-owners and placed in escrow in the First National bank, where they will remain until the money is paid, which will be inside of 90 days. The syndicate has already examined the property thoroughly and is perfectly satisfied with it, but Captain Plummer of the Elkhorn Co. will arrive in a few days to make another examination. It is the intention of the syndicate to put in additional machinery and sink four shafts for the thorough development of the property, which, when opened up, cannot fail to prove a bonanza to the syndicate and of inestimable benefit to Walkerville

and Butte. The purchase gives the company 9000 contiguous feet along one of the best silver veins in the camp, which is ample room to work the ground on an extensive scale and extract therefrom millions of dollars. In the past the Amy and Silversmith has produced a vast amount of silver and gold, the dividends alone being \$249,000. It is developed to a depth of 500 feet, and up to a short time ago was under lease to several Butte men, who worked it at a profit until fire destroyed the hoisting works. The Goldsmith is also a heavy producer, is developed to a depth of 400 feet, and for years has been worked continuously by its owner, George Tong. The other properties have not been developed to any great extent, but they are known to be good and with a little work will become paying propositions of no small proportions. As soon as the money is paid over the work of improvement will be commenced and prosecuted with vigor, and in addition to the large number of men now employed in and about the camp, hundreds more will find work through the enterprise of the company. In connection with this sale it is said that the syndicate is casing about for a suitable site on which to erect a mill and smelter for the reduction of its ores, and that Butte will be the favored spot.

NEW MEXICO.

PIÑOS ALTOS.—*Silver City Enterprise*, Feb. 20: The Aztec Co., of Pinos Altos last week let a contract to Messrs. Guthrie and Herson, two experienced miners, to run a tunnel 600 feet starting from the Aztec camp and designed to cut the Kleptomaniac lode at a depth of 470 feet. Work was started on Wednesday the 11th ultimo and will be prosecuted vigorously. Two shifts are at work, and the force will be increased as requirements may demand. When completed, ore will be brought from the tunnel instead of through the shafts, making a great saving on cost of extraction. The company will have great reserve of ore above the tunnel level, and with less cost in mining and transportation to the mill ought soon to pay dividends. Frank Bissbee has a carload of rich ore ready for shipment from the Mosarch mine at Lone Mountain. It is expected that the ore will run 250 ounces in silver per ton. W. H. Newcomb is shipping five cars of iron ore per week to Socorro. Troutman and Smith are shipping 50 cars of iron ore per month to El Paso. The ore is being taken from the Newcomb claims by an arrangement between the two parties. The Silver Mining company of Lake Valley last Friday paid a dividend of 10 per cent on the capital stock of the company. If we remember rightly this is the third dividend in 12 months. A big strike was made in the Mammoth mine on last Friday morning, in the bottom of the shaft at a depth of 220 feet. The rich ore when first struck was 18 inches in width but has since spread to two feet. From general appearances the ore will pay handsomely to ship to the smelter without concentration.

CONCENTRATOR.—*Chloride Black Range*, Feb. 21: Supt. H. W. Russell of the Silver Monument mine has received instructions to go ahead with the construction of a concentrator for the mine. The erection of the mill will be commenced as soon as lumber can be procured. The wagon-road from the mill has been completed, ore-bauling to the mill commenced to-day, and all that prevents the starting of the mill is the cold weather. Last week a streak of ore, one foot wide was struck in the shaft of the U. S. Treasury mine that gave returns of 37 ounces gold and 255 ounces silver to the ton. The shaft is down 125 feet, everything hoisted from it is sacked for shipment, and the rich vein of ore above mentioned increases in dimensions as depth is gained. The new Blake crusher for the Chloride M. and Reduction Co.'s mill arrived last Saturday, has been placed in position ready for business, and will be set in motion just as soon as the weather moderates sufficiently to allow the mill to start up. The crusher is an excellent piece of machinery and has a capacity of 60 tons every 24 hours. The ore dumps of the St. Cloud group of mines are overcrowded with many hundreds of tons of ore, and there are also vast quantities of ore in sight in the mines. Those who some months ago wondered where the ore was coming from to supply a 50-ton concentrator will soon be wondering where all the ore does come from.

OREGON.

MINERAL.—Cor. *Bedrock Democrat*, Feb. 20: Snow has fallen quite a depth in the camp and snow-shoes are in demand. Mineralites are in the best of spirits and the camp looks well. The Black Maria is working about ten men at present. Messrs. Noble, Kertoff and Murray are driving a 400-foot tunnel to tap the Little Chief. M. Duffy is working a small force on the Black Hawk. There are three men at work on the Transit, a valuable property owned by Wing & Sommer. The Transit is a two-foot vein and gives an average assay of 140 ounces in silver to the ton. With the opening of spring development work on hundreds of locations will be vigorously prosecuted and the camp will present a lively appearance.

UTAH.

THE TINTIC SALE.—*Salt Lake Tribune*, Feb. 19: Yesterday the *Tribune* told of the taking up of the bond on the Cleveland and Lancaster mines, Tintic. It is understood the price paid by Captain Ryan & Co. was some \$2000. These claims are about one-half mile from Silver City, on the trail from that town to Mammoth.

GOOD FROM DEEP CREEK.—The *Tribune* is in receipt of a letter from the Deep Creek country. The writer says there is more mineral around Deep Creek in a radius of 50 miles than in any other farming valley in the United States, and which will average proportionately of high grade. Then there are thousands of acres of as fine soil as lays out doors, and which will all be tilled in the course of a few years.

COPPER FROM BINGHAM.—McVicker had in hand a fine sample of copper ore from a claim owned by Jack McNally, and which will run about 30 per cent copper. As the assay was not completed, the amount of other metals was not known. This claim is on main Bingham near the old Hazelgrove mill above the town, and the ore was pronounced by McVicker as being very good.

A SMELTER.—*Salt Lake Tribune*, Feb. 10: P.

A. H. Franklin is authority for the statement that in all probability a foreign syndicate of capitalists will erect a smelter in this city which will cost \$1,000,000. An expert representative from Europe is now en route here for the purpose of looking over the grounds. The institution will have a capacity of 2000 tons of ore per day, and will be such as to handle and take care of everything that may come here. All processes will be used and the necessity of Utah, Montana, Idaho and Nevada ores being shipped to Denver and Omaha will be obviated. The new corporation has learned of the projected line to Deep Creek, and the building of that road, or the assurance that it will be built, will influence them to a greater or lesser extent.

BONANZA FLAT.—*Park Record*, Feb. 21: The section of country known as Bonanza Flat is going to be more active next summer than ever before. The sale of the Pioneer group is a wedge that will split wide open the popular fallacy which seems to possess the Salt Lake papers, hotel men and citizens in general, that all the rich ground on the great mineral belt is owned by the Ontario, Daly and Anchor companies. For years the story went—and it was firmly believed—that the Ontario and Daly embraced the entire vein; but the discovery and rich developments in the Anchor exploded the theory, and it was at once assumed that such an immense body of ore could not be very extensive and must stop within the Anchor lines. It does not seem to enter the heads of these people that the Ontario, Daly and Anchor are composed of more than one vein, and that while those properties are near the center, the mineral zone extends over into the Cottonwoods, with a width of not less than two miles. Its course is nearly east and west, which gives Bonanza Flat four or five rich veins. All that is needed to demonstrate this fact is a few thousand dollars expended on the ground of Smith Ehenger, Farish & McLaughlin's West Ontario, H. Hirschman's Black Diamond and Nimrod, the Dolberg group or the Kennedy group. This ground is all patented and each group has enough developments to show that each is a big mine in itself. The great trouble is there has been a desperate attempt made by the big companies for years to corral that whole section of country, but the prospectors have been too much for them and are still holding on. Once outside capital makes a big strike, the whole matter will change. The ore is there; the ground is there; it is patented and can be obtained on reasonable terms. The entering wedge is the Pioneer group, and in a few years' time it will make Bonanza Flat as active as Ontario Hill is to-day.

THE NORTH END TINTIC.—*Salt Lake Tribune*, Feb. 22: The North End group at Eureka, Tintic, is looming up in good shape since the strike reported in the Yorkville tunnel last week. Johnny Davis has struck some fine ore still farther north after sinking only six feet. Specimens of it will run 60 ounces. Mining men look for great developments in the North End this coming season.

ORE IN THE GLENCOE.—Supt. Curtis of the Glencoe mine received a telephonic message from Park City yesterday saying that there was three feet of ore in the face of the drift, and the mine is improving, and hence promising to become a big property.

MAAMTOO SWITCH MILL.—Truman Schenck goes to Tintic to-day to commence work on the sampling-mill to be erected near the Mammoth switch. Now that the location is agreed upon, the building and machinery will soon be in position and the works running.

WASHINGTON.

WHERE MINING IS DONE.—*Seattle Press-Times*, Feb. 11: There are eight counties in Washington in which mining operations are carried on to greater or less extent. They are as follows: King, Kittitas, Skagit, Snohomish, Stephens, Okanogan, Pierce and Lewis. To these might be added Whatcom, which is again assuming importance as a coal-producer. In six of the counties above named—King, Kittitas, Skagit, Snohomish, Stephens and Okanogan—precious metals exist, and mines of gold, silver, copper and lead are being opened up on an extensive scale. The government reports up to within the past year have merely mentioned Washington as a mineral-producing section, and have credited it with the production of \$100,000 in gold taken from the placer mines, but silver seems to have had no place on the records. The opening of the mines for precious metals may properly date from the year 1891, and the outlook for this year is very flattering.

KITTITAS DEVELOPMENT.—The Ellensburg Improvement Co., having received subscriptions to the amount of \$200,000, are erecting a small blast furnace for the purpose of testing the iron ores of Kittitas county. This furnace is to be followed by one of larger capacity, together with rolling-mills, nail and bolt works, car works and other iron manufacturing. The citizens of this enterprising place have not waited for outside capital to aid them in this important work, but have taken hold with a degree of energy that is certainly commendable. They say Ellensburg is surrounded by an iron country more extended than that surrounding Birmingham, and there is nothing to prevent it becoming a city of 25,000 or 30,000, and one of the greatest iron centers in the United States. They hope to have their first furnace in operation in about 60 days.

AROUND SPOKANE FALLS.—*Northwest Tribune*, Feb. 21: The Blue Bird mine on Blacktail mountain, in the Pend d'Oreille district, is assaying 400 ounces of silver to the ton. The Webber claim, in the same district, is making a fine showing. Pigment has been found in large quantities in Horse canyon, near Ellensburg, and a company has been organized for the purpose of manufacturing it into paint. One of the largest iron discoveries ever made in the Northwest is in the Iron Mountain district, Kittitas county. It is a veritable mountain of iron ore; thousands of tons of iron can be taken out with little trouble and expense. A. D. Wheeler, on his return to Kootenai Lake, B. C., will begin extensive operations on the Kootenai Chief mine, property of the Ainsworths. This mine is the south extension of the famous Blue Belle, and is considered equally as extensive and valuable. It is now established beyond doubt that the Morning mine will change hands. The only delay there will be, if any, will be the time required for a satisfactory distribution of the shares of the property among the individual members of the purchasing syndicate, and for the adjustment of the minor details of the deal.

MECHANICAL PROGRESS

The Evolution of Machinery.

Although the Societe Cockerill was established by an Englishman, with English methods, it is now in many respects different from the English works. It is an example of what can be developed within an immense works without going outside to find out what other people are doing. As in the Darwinian theory, the evolution of animals depends upon the environment, so upon the environment depends the evolution of machinery. The environment in America is an intoxicating atmosphere to begin with, a temperament in the people which leads them to ransack the world for the best things and the most modern, high wages tending to cause the substitution of brains for muscle and machinery for both, and high interest tending to economy of capital.

In Belgium we have the exact opposite. A more sedative climate, a conservative temperament, a love of home products, and a disinclination to travel, low wages and low interest. The result is, in America, machinery is built light, cheap and for high speeds. It is not built with an especial view to lasting a lifetime, because it is known that long before it is worn out it is useless in a workshop, because there have been built other machines which are so much better that it pays to throw it out. In Belgium, machinery is heavy, expensive and moves slowly.

For instance, in America we long ago learned that the blast-furnace blowing engine, erected about 12 or 15 years ago by the Thomas Iron Co., at a cost great enough to have built a good-sized complete furnace plant, was, although a good engine, an engineering monstrosity, and we now favor the engines of Mackintosh, Hemphill & Co., and the Weimer Machine Co., which are much cheaper for the same amount of blast. But in Belgium I saw a new blowing engine being built for a blast furnace in France, which, I think, is a greater monstrosity than the old one in Hokenandqua. It has more cast iron in it, and I think occupies about double the ground area which I saw (about three years ago) occupied by an old horizontal slow-speed engine at the Eliza furnaces (Laughlin & Co.) in Pittsburgh. If that Belgian engine was in Pittsburgh the money it would bring as scrap iron would probably build a Hemphill engine to do the same work. Another example of the evolution under this environment is the greater use of human labor as compared with horse or machine power. The women drawing the little carts of coal instead of horses, locomotives, or wire-rope traction, for instance. Also, hand riveting is still exclusively used in boiler work instead of machine riveting.—*Ex.*

Shot and Burnt Iron.

This is a class of iron that foundrymen dislike to have anything to do with, on account of its mixing in and contaminating other irons. Shot iron will sometimes cause hard spots in casting; it also causes them to crack, and very often 500 or 600 would make a 6000 heat of soft iron so hard that half of the castings would be condemned. Shops that can use nothing but very soft iron in their castings generally have trouble to get rid of shot iron; there are some shops that will not bother with it at all; they will pick out all the iron they can from the cinder and let the rest go, and it has been a question whether they were not as well off as those who paid help to screen the cinders, and use the shot iron at the expense of making bad castings. Molders have tried in many ways to use shot iron so as not to spoil good soft iron, and about the best plan is to make a separate heat of it, or melt it at the last of a heat for coarse work, or pour it into "pigs," which can then be used to mix in with good pigs in future heats; but in any form it should be used with caution. Burnt iron, in some respects, is like shot iron, so far as making bad work is concerned. Burnt iron makes more slag than any other iron and causes a cupola to choke quicker. There are degrees in burnt iron; some are worse to deal with than others, but with shot iron it is all about alike. Burnt iron should be used in small quantities only at a time, unless a lot of sash weights are to be made; then a heat can be made of nothing but burnt iron, and the cupola run until the ladles and cupola are all choked, if one desires to do so. In melting ordinary mixtures of iron, such as that used for common castings, there is seldom trouble caused from the different kinds of scrap or pig not giving the quality wanted, when shot or burnt iron is left out, and the meter charges the iron and fuel as it should be done.—*Glasgow Engineer.*

THE TESTING OF IRON AND STEEL.—If a fracture of iron gives long, silky fibers of a leaden hue, the fibers cohering and twisting together before breaking, it may be considered a tough, soft iron. A medium, even grain mixed with fibers is a good sign. A short, blackish fiber indicates badly refined iron. A very fine grain denotes a hard, steely iron, apt to be cold-short and hard to work with the file. Coarse grain with brilliant crystallized fracture and yellow or brown spots, denotes a brittle iron, cold-short, working easily when heated. This iron welds easily. Cracks on the edges of bars are a sign of hot-short iron. Good iron is readily heated soft under the hammer, and throws

out but few sparks. Nitric acid will produce a black spot on steel; the darker the spot the harder the steel. Iron, on the contrary, remains bright if touched with nitric acid. Good steel in its soft state has a curved fracture and a uniform gray luster; in its hard state, a dull, silvery, uniform white. Cracks, threads, or sparkling particles denote bad quality. Good steel will not bear a white heat without falling to pieces, and will crumble under the hammer at a bright red heat; while at a middling heat it may be drawn out under the hammer to a fine point.—*Glasgow Enquirer.*

On the Crystallization of Iron.

At a recent meeting of the South Staffordshire Institute of Iron and Steel Works' Managers, held at Dudley, Mr. Thomas Morris, F. G. S., of Warrington, contributed a paper on "The Crystallization of Iron," in the course of which he said that the term crystallization, when applied to iron, was generally used to signify that the structure or composition of the iron had assumed a new form while it had been in use. Accepting that postulate, and proceeding therefrom, he said that during his time—over 46 years—at the puddling furnace, inventive geniuses by the score had come forward to assist the puddler to produce fibrous iron and discover reasons for crystallization occurring as it did, in the first or new-born stage of wrought or puddled iron, and in all its subsequent workings into the merchant iron of commerce. His experience was that, with one or two exceptions, merchant iron, when work was commenced upon it, either by forging, or smithing, or turning, or planing, or bending, did not, when it left those workmen, contain the same virtue as regards being fibrous as it did when they first took hold of it.

Engineers and others, ever since Cort invented the puddling process and iron came into general use, had held ideas that all iron work, when doing duty, was subject to singular and important changes in its structure, and became crystallized, assigning various reasons, such as vibration, heat, percussion, magnetism, frost or extreme cold, etc. The civil engineers 50 years ago held very diverse views on the subject—some that crystallization was greatest in those parts of an axle where the vibration was greatest; others, in those parts of machinery where concussion was most severe, and others, at those parts where, in the course of manufacturing process, the hammering or forging was heaviest.

His own belief was that the change in the nature of iron was due to (1) the effect of oxygen during the puddling process and overheating in subsequent workings; (2) compression, and (3) puddled iron produced from ores containing a large percentage of silica. Dealing with the first cause, he said that when iron during the puddling process is coming to the nature of wrought iron, it is extremely sensitive, and his opinion was that by overheating when in this state, an excess of oxygen is obtained, which is the principal cause of the iron subsequently becoming crystalline. Compression is a prolific cause of this granulation or crystallization. This is especially observable in chains passing over a pulley, giving it a sort of hammer hardening, which tends to convert fiber into grain. The primary cause of crystallization is the excess of silicious ores or from "cinder pig," from which merchant iron is produced.

It is impossible to produce the same quantity of iron from silicious ores, or cinder, as is produced from the hematite ores, as it was for the old alchemists to find the stone they dreamed of which was to convert all base metals into gold. Hence, for the consumer of iron to expect the same quality from different districts is a mistake, unless the native ore is discarded by the pig maker and others imported. Nearly all iron manufacturing districts have their own specialties, and the manufacturer, by judiciously mixing the pigs for the puddling process, and by good puddling, attains for his purpose, and produces for his customer, the suitable common crown iron of commerce.

In process of time, that very iron becomes so much scrap, and is bought up for working into shafts and other uses and forgings; but what fibers were developed in the first and second workings by the ironmaster, are lost in its third working, and become crystalline, and if breakage should occur, it would invariably take place in that part of the forgery where such scrap had located itself, not because it had become crystallized through vibration while doing duty, but because it was so at the commencement.

It was through this rather unreliable material that the necessity of high-class crank and other shaft manufacturers starting to build up their forgings with fresh, reliable iron, arose. Formerly, the extra cost of the latter deterred the erecting engineer from ordering it, and at times the unscrupulous maker from using it for temporary gain; and in case of breakdown of their work, their pet "vibration" had to bear upon its broad shoulders the stripes those sinners were so justly entitled to.—*Western Machinist.*

JOHN RICHARDS, president of the Technical Society of the Pacific Coast, read a paper at the last monthly meeting on "Abrasive Cutting in the Mechanical Arts."

To DRILL a three-fourths inch hole through Bessemer steel at the rate of one-fourth inch per minute requires one-fifth horse-power.

SCIENTIFIC PROGRESS.

The Artificial Production of Rain.

The question as to whether rain can be produced by artificial means is to be tested by the United States Government. On the motion of Senator C. B. Farwell, of Illinois, a clause was added to the Appropriation Bill, which provides that, under direction of the Forestry Division of the Department of Agriculture, \$2000 shall be expended in experiments having for their object the artificial production of rainfall by the explosion of dynamite. But Senator Farwell does not intend to limit himself to this small sum, and will, if necessary, contribute from his own pocket such sum as may be necessary to complete the trial to his satisfaction.

In a communication from Senator Farwell the following theories are advanced: "My theory in regard to producing rain by explosives is based partly upon the fact that after all the great battles fought during the century, heavy rainfalls have occurred. This is historical and undoubted. Senator Stanford, one of the builders of the Central Pacific Railway, informed me lately that he was compelled to do a great deal of blasting through a part of the country where rain had never been known to fall in any useful quantities, and where it has never rained since, and that during the period of the blasting, which was nearly a year, it rained every day. I feel almost convinced that rain can be produced in this way. The dynamite could be exploded on the ground or up in the air, and I think I would prefer the latter. The experiment should be made in eastern Iowa, Colorado, or in western Kansas, somewhere along the railway, and my own idea would be to commence early in the morning and explode continuously for seven or eight hours."

While this scheme does not give a very great promise of success, it would be interesting to see the experiment tried and even partial success would be of great value. If the farmers of Colorado and western Kansas could get a shower once a week by sending up torpedoes every day, the result would be well worth the trouble, and there is plenty of reason to suppose that such artificial showers, by fostering the growth of vegetation, would in time produce the conditions which lead to regular natural showers, and the consequent permanent establishment of fertility throughout the region to which the process is to be applied.

The Modern View of Electric Currents.

The electrician who knows the theoretical part of his science only as he studied it five or ten years ago, finds his knowledge sadly at fault when he is confronted with the theories and ideas of to-day. Not that any great and radical changes have revolutionized electrical theory in these last few years, but there have been great additions to our knowledge of certain occult phenomena, and theory has advanced correspondingly. We were accustomed to look at the electric current as something that flowed in or along a wire, and too many students grew to think of it almost as a fluid. To those who depend slavishly on the set theories it is rather a rude shock to realize that in very many cases we should pay far less attention to electrical disturbances in the conductor than to the extraordinary pulsations of energy that surround it. We must to-day think of a wire carrying a current not as a tube in which a certain mysterious flow is taking place, but as a mere linear nucleus along and around which there is a ceaseless flow of energy capable of producing tremendous effects even far away from the wire. We must think of the conductor not as a thin line of wire, but as the center of a far-reaching electro-dynamic disturbance. To take an extreme case, an alternating current of very short period, capable of producing enormous inductive effects and transferring immense mechanical power, might penetrate the accompanying conductor hardly more than skin deep. What would go on within the wire we might almost neglect—it would be only as we neared and passed its surface that electrical energy would manifest itself. And further, it is a surprise to realize that electro-magnetic induction has suddenly fallen into line with other forms of radiant energy—that the light and warmth of a summer's sun differ from the solar waves of induction that produce magnetic storms only in degree—that a gas flame is just as truly an exhibition of electro-magnetic energy as an electric light. But all this, which may sound so revolutionary, is not new; it has gradually been unfolded during fifteen years of splendid theoretical investigation, and has waited, as the law of gravitation waited more than two centuries ago, for the connecting link of experiment to bind firmly together brilliant hypothesis and reconcrete mathematics.—*Electrical World.*

PHOSPHORESCENT CENTIPEDES.—That there are luminous Myriapods has been known for many years, as also the fact that they occur only among the family *Geophilidae* of the Chilopod Myriapoda. Both sexes are luminous, sometimes quite intensely so, and the luminescence spreads out over the whole ventral surface of the animal. If one of these *Geophilids* is taken up, the luminous matter communicates to the hand of the observer or to anything else with which the specimen comes in contact. There is considerable dispute regarding the origin of this phosphorescent matter. Accord-

ing to Dr. R. Dahols, it is contained in the epithelial cell of the digestive tube, and the emission of the light depends on the molting of the digestive tube. Mr. Macoe, on the contrary, contends that the luminous matter is a glandular excretion, and that these glands (*glandes preanales*) are situated on the last two segments of the animal. Mr. J. Gazagnaire has satisfied himself that the luminous matter is secreted from glands situated on the sternal and episternal plates. Upon pressure these glands secrete a yellowish, viscous substance, having a peculiar odor and which is highly phosphorescent. In a more recent article (*Mem. de la Soc. Zool. de France*, v. iii, 1890), Mr. Gazagnaire reviews all previous observations on luminous *Geophilids*, and finds that, so far as the European fauna is concerned, luminous specimens were found only between the end of September and beginning of November. The luminescence appears, therefore, only at a certain epoch in the life history of these Myriapods. Further, in all more carefully recorded cases, luminous specimens were never found singly, but always in pairs or in companies of three or more specimens. The few and fragmentary observations that have hitherto been made on the mode of reproduction in these animals seem to prove that the fecundation of the female takes place in autumn, or just at the time when the luminous specimens are found, and Mr. Gazagnaire is thus fully justified in connecting the appearance of luminescence with the excitement caused by sexual instinct. In Algiers, Mr. Gazagnaire observed luminous specimens of *Orya barbarica* in the month of April, and he concludes that in other countries and in consequence of altered climatic conditions the period of luminescence probably differs from that observed in Europe.—*Insect Life.*

KNOTS IN DIAMONDS.—In cutting a diamond sometimes a knot is discovered. These are little substances as much harder than the diamond itself as you can imagine. They are to the stone, the same as a knot in a pine board. When a diamond with these characteristics is discovered it has the same effect on the polisher that the striking of a nail has upon a carpenter when sawing a board. It takes months and months to polish knotty stones, and I have known a year's work to be put in one of them; of course, not of constant labor, but to be picked up at odd times when there was nothing else to do. The polisher has also to guard against chipping the stone, for it should be understood, the diamond has a grain the same as a piece of wood, and the least carelessness might result in knocking off a third of its weight. While disasters of this kind are not infrequent, they are seldom the result of inexperience or laxity on the part of the workmen. When a polisher takes a stone, one of the first things he does is to find out the direction of its grain, so as not to cut against it.

MICROSCOPICAL SOCIETY.—At the annual meeting of the San Francisco Microscopical Society a proposition to reduce the price of membership was unanimously voted down. After transacting the routine business, the following officers were elected for the ensuing year: President, E. J. Wikeson; Vice-President, Dr. J. M. Selfridge; Recording Secretary, Wm. E. Loy; Corresponding Secretary, A. H. Breckenfeld; Treasurer, Chas. C. Riedy. The society is endeavoring to secure larger rooms and feels very sanguine of success. The finances are in good condition and the affairs of the society are prospering. Many additions to the library and apparatus have been made since organization. The growth of the society has been slow, yet its membership has steadily increased.

A NEW NON-FUSIBLE BULLET.—A bullet has just been patented, the base of which, as well as the body, is covered by an alloy non-fusible at any temperature which it is possible to generate in a gun barrel. The necessity for such a bullet has been caused by the introduction of nitrated or smokeless powder, which generates such intense heat that the base or head of the bullet is melted and consequently made ragged. Accuracy of aim is thus much impaired. The tendency of late, in the desire to secure increased accuracy, has been to diminish the size of the bore and resort to compressed powders and cased bullets, and the new bullet comes in most opportunely and enables the latest improvements to be utilized.

THE MELDOMETER is the name given to a new and simple instrument for observing the behavior of bodies at high temperatures. It fits the stage of a microscope and consists of a platinum strip between two clamps. An electric current heats the strip, and material laid on it is soon heated up, the temperature being regulated by a carbon resistance controlled by the operator. Quartz is easily melted by this method, which also possesses the property of being applicable to the examination of sublimates during and after their formation.

SPONTANEOUS COMBUSTION IN SILK.—A new ocean danger is pointed out by silk importers. It appears that dyed sponge silk, known technically in the trade as French silk, is, under certain conditions, exceedingly prone to combustion and is well known among the steamship companies as dangerous freight.

SCIENTISTS are still in doubt what causes fire to burn blue when salt is thrown on it. Copper, chlorine and carbonic acid are each said to be at the bottom of the mystery.

The New York Cancer Hospital on the San Francisco Cancer Cure.

An Open Letter to the Managers.

Some two months since a request was sent to the managers of the New York National Cancer Hospital asking them to send to this city two or three patients, for trial treatment, afflicted with typical cases of cancer in as many of its various forms. The request was made of that institution mainly because its original promoter was the widow of one of San Francisco's most honored and respected citizens, General Halleck. That lady died from cancer; but just before her death she laid the plans for founding that institution, gave \$50,000 in cash, and left in her will property valued at about \$150,000, a large portion of which has already been realized and transmitted thither by her executor, Col. G. W. Grannis. The lady died before the hospital was built, and often during the last days of her life, as we are told by Col. Grannis, she expressed the wish that the managers of the hospital, whoever they might be, when they came to take upon themselves such management, should make the cause of cancer a special study and also make special efforts to seek a remedy.

It was for this reason that Col. Grannis and some of his friends, the writer among the number, thought it no more than right that that institution be memorialized to lend its influence in the manner proposed, to make a thorough investigation into the value of the alleged remedy for that disease which, to all appearances, has been successfully employed for several years in this city.

Col. Grannis recently received a reply to his letter from Henry C. Coe, M. D., the attending surgeon of the hospital and Secretary of the Board of Managers, as follows:

G. W. Grannis, Esq.—MY DEAR SIR: An apology is due to you for the long delay in replying to your favor of Dec. 27th, addressed to Mr. Parsons. It has received careful consideration from the Board of Managers and was referred by them to the Medical Board, by whom I am instructed to reply as follows: After a careful review of the various reports of the San Francisco Doctor Cook's cases, the Medical Board are unanimously of the opinion that it would be unwise to send patients there for treatment, as it would open the doors to other cancer-curers who are constantly urging their claims upon us. While we are always ready to accept and to try any remedy for cancer which is presented openly and in a scientific spirit, we are not willing to submit our patients to any experiments the progress of which we cannot watch ourselves.

So far as we can see, in not a single case of "cure" by Mrs. Cook's treatment was the tumor examined microscopically (1) and the diagnosis of cancer thus confirmed—the only sure means of diagnosis. Moreover, the party only claims good results in the incipient stage of cancer. (2) These are just the cases in which complete removal by the knife promises a permanent cure—of which I have two examples in my own family (my own mother being one). (3)

I may add, my dear sir, in order to convince you that we are not liberal in this matter, that we have taken the pains to find out through medical friends in San Francisco, Mrs. Cook's manner of treatment, (4) and we can see little difference between her method and those of the innumerable "cancer doctors" who flood the country with their pamphlets. Thanking you for your interest in the hospital, and for your valuable services in its behalf, I remain, very truly yours,

HENRY C. COE, M. D.,

Attending Surgeon and Secretary of the Board of Managers,
New York, Jan. 26.

Comments on the Above.

(1) In regard to this matter, we would call attention to the well-known fact that when in case of cancer the nipple in the breast is largely retracted and drawn in, every surgeon will say it is a reliable diagnostic sign of scirrhus. Of course it is not so absolutely reliable as a microscopic test. In Mrs. Dr. Cook's patients, this condition has often been reached and been successfully treated. The retracted nipple has also been accompanied by the usual indurations, with adhesion of and dimpling of the skin over the tumor. Moreover, before resorting to Dr. Cook, a number of such patients have been pronounced by leading medical men to be suffering from scirrhus cancer. Some of her cases have even reached the operative stage. In cases which had not reached this stage, but which manifested all the other indications, would any surgeon in any hospital think of eluding and probing the tumor to obtain diseased tissue for microscopic examination? No; he would say, as has been said and testified to by some of Dr. Cook's patients: "The doctor said that when he had taken my breast off he could tell if it were really cancer."

Mrs. Cook's rule is, not to wait a moment, but to attack at once, with her alternative medicine and absorbent saline, the deadly malady. In how many cases, we solemnly ask Dr. Henry C. Coe, has the microscope been used in the past by the mutilating surgeon? Is it the rule among surgeons to use it? In what proportion of cases operated on do surgeons make sure of the tumor being malignant with that instrument? We assert that if the microscope be the "only sure means of diagnosis," it will entail a waiting on the part of most patients which must end in but one way.

Dr. Cook would never permit a breast to be eluded and probed in experimental barbarity. An unbroken surface on the skin has been one of her great feats in her line of treatment, which is very different from that em-

ployed by the "innumerable" cancer doctors," or the useless hutchery of knife-wielding surgeons.

(2) Dr. Coe has been altogether misinformed in this regard if we understand what he means by "incipient stage." We believe the faculty will admit that when a case has so far advanced that there is a most marked retraction of the nipple and the surgeon is ready to put his knife into the breast, it has then quite passed its "incipient stage," and then is the most immediate danger that the virus will begin to pervade other parts or organs of the system, if it has not already done so, through the medium of the lymphatic glands. Yet it is just such cases that Dr. Cook most willingly undertakes to cure, and succeeds in nine cases out of ten. Even beyond that, she has treated successfully quite a number of cases when under the full conditions above named, and even after the patients have been first operated on and the cancer has again made its appearance. One such case from the city of Washington was present at the meeting which Col. Grannis attended. We submit that such cases are not in the "incipient stage."

We are prepared to furnish the fullest evidence that Dr. Cook has cured a number of such advanced cases, not extirpated but dissipated the cancers by simple local outward applications, accompanied, as they always must be, by inward alternative remedies. In such cases the skin is not even abraded, and no pain given whatever. Can any of the innumerable "cancer doctors," or even regular practitioners, lay claim to such success?

At the risk of being tedious, we will name two cases now under treatment.

Three or four weeks since several prominent ladies and gentlemen of this city (one of the former holding graduation diplomas from each of the three medical schools) met in the parlors of Dr. Cook to inform themselves more thoroughly by personal conversation with her patients in regard to her alleged cure. While at that meeting, a lady and her husband came in from the city of Seattle, Washington, and asked for an examination. The doctor alluded to and Dr. Cook made an examination and pronounced it an unmistakable case of scirrhus; the patient then remarked that three leading physicians in Seattle had also pronounced it scirrhus. The visiting ladies present then proposed that one of their number should take the patient to a prominent San Francisco physician a few blocks away and get his opinion. The suggestion was acted upon and the case again pronounced unmistakably scirrhus. It was then determined by those present to make this a test case. To make it still stronger, the writer called upon another prominent physician—one of the oldest and most reliable in the city. At our request, he visited Dr. Cook, examined the patient carefully, witnessed the treatment, examined her remedies, and then gave his attention to another among several patients who happened to be present, and pronounced each of them typical indisputable cases of scirrhus. Both of these cases are doing well and yielding kindly to the action of the remedies which are being used. Of course they are not yet cured, but they will be. When the result is reached we shall report it in these columns, whether favorable or otherwise. We trust our readers will be kind enough to watch for it.

(3) Dr. Coe, it seems, would operate on cases that are "in the incipient stage." Why does he? He apparently acknowledges that Dr. Cook may cure such cases. We know she does, and we have never heard of such a case undertaken by her which she has not cured when the patient has remained with her and followed her directions. If Dr. Coe will send an expert here where the witnesses live we will give him abundant proof of all the facts herein stated. Why maim and destroy a woman's breast with the knife where the trouble can be easily removed without breaking the skin? Such cases may be cancer, they may be merely benign tumor, but they are cured all the same. Why then use the knife? When the knife or plasters are used, the hooks, and surgeons as well, tell us that the malady returns in nineteen cases out of twenty. Why? Mainly because the extirpation is not followed by proper alternative, constitutional medicines. The doctors don't believe in it. Dr. Cook does. She always asserts, and could not effect permanent cures without it. Not one of all the many cases which she has treated and pronounced cured has ever returned. This we claim to be the climax of proof that she has a positive specific.

(4) Here Dr. Coe is again wide of the mark. He has found out no such thing. To our certain knowledge he has never written to a single "medical friend" in this city who knows anything about Dr. Cook's manner of treatment. We have visited all in this city who do know anything about her treatment, and no one of them has received any communication from Dr. Coe. The fact is, Dr. Coe has been imposed upon by some "medical friend" who assumes to know, but who has never visited Dr. Cook and knows no more about her treatment than does Dr. Coe himself. Will Dr. Coe be so kind as to furnish us with the names of his "medical friends" in this city who have furnished him this information, as we have already requested him to do in a private letter?

The common received opinion of Dr. Cook's treatment among medical men in this city is as wide of the mark as the north and south poles are apart. The trouble is, medical men refuse to inform themselves as to the truth of this matter, though often asked to do so. Dr.

Cook's doors are always open to any honest investigator and her remedies are also open to inspection.

Dr. Cook Employs no Arsenic or Other Poisons as the Regular Physicians and Other "Cancer Doctors" Always Do.

It is the common report that Dr. Cook employs arsenic or other caustic mineral in the way they are generally used by the "regular faculty" and the "innumerable" cancer doctors who flood the country with their pamphlets. True, Dr. Cook formerly used a mild form of plaster to aid her remedies, but only in exceptional cases. During the last few years, however, by reason of improved remedies, she has been able to dispense with them altogether. Several of our more liberal physicians who are indifferent to the anathemas of the faculty, have, from time to time, investigated and become satisfied that her methods and remedies are eminently worthy of official investigation, but the ruling majority refuse to look into the matter at all. On the contrary, they shelter themselves in a stolid agnosticism, while many even allow themselves to drop into the resort of all big game—personal abuse. These are the reasons why the inquiries from New York have not been correctly replied to by the "medical friends" in this city. As already said, Dr. Cook uses nothing but the mildest remedies, such only as are derived from the vegetable kingdom. Her remedies are open to chemical tests, and every doctor knows that minerals can readily be detected in any preparation. That she has cured large numbers of cases which have been pronounced cancer by the most reputable physicians of this or any other city is incontestable of the most positive proof. Her treatment is for the cure of cancer—not for extirpation, as is the treatment of the regular faculty and other "innumerable cancer doctors."

Why Do San Francisco Physicians Ignore This Cure?

And why do they refuse to investigate a matter of so much seeming importance which lies at their very doors, while they rush by scores to experiment with the secret remedy from Berlin? This is a conundrum which we acknowledge being unable to answer in a way satisfactory even to ourselves. We have asked quite a number of physicians and others, and have received such answers as the following: 1st. "Well, there is more money in the present mode of practice." 2d. "Physicians must live, you know." 3d. "It is a secret remedy." 4th. "We don't believe in it." 5th. Dr. Cook is a quack," etc., etc.

We prefer not to make any comments on the two former answers. In regard to the third, we would reply, "So is Dr. Cook's." 4th. Then why not make a slight effort to look into it as you are doing with the consumption cure? 5th. If a quack, she is a very good quack, and many lives would be saved and an immense amount of suffering avoided in this city, if every physician was just such a quack.

There is One Other Important Reason.

It is the pressure brought to bear upon almost every one in the profession who attempts to inquire into this question. Some three years ago a friend of the writer, a young doctor in good standing in his profession, and a clinical teacher in the Cooper Medical College, ventured to look into this matter long enough to satisfy himself that there was much in it. He prepared a paper in regard to his investigations and attempted to read it at one of the monthly meetings of the San Francisco City and County Medical Society. He was summarily ordered to take his seat, and no effort of several of his medical friends could avail to obtain for him permission to read his communication. The writer, who was present at the meeting by invitation of a medical friend, was requested to leave the room. This is one of the many means resorted to to suppress the truth. Free speech is not allowed in the meetings of the San Francisco Medical Association, any more than it is in autocratic Russia.

The young physician alluded to, who deserved better things at the hands of his medical brethren, was dismissed on the following day from the position which he had diligently and faithfully filled in the Cooper Medical College. These facts are beyond dispute.

One or two of our other physicians who have been desirous to investigate have been notified that they must cease all such inquiries or their names will be dropped from the roll of the association.

The Malediction of the Profession.

That the practice of three years ago is still in force is shown by the following recital, the truth of which can be shown, although for evident reasons the name of the physician cannot be given. The occurrence took place some four weeks ago. The reader of these lines will please refer back to the mention made of a patient having been taken from Dr. Cook's rooms to those of a physician near by, who reiterated the diagnosis of others that the case was one of advanced scirrhus. A friend of that doctor who had knowledge of the facts, and who is one of high standing in this city, called upon him a few days since, and in reference to that patient remarked that she was getting along finely and would soon be discharged as cured. The doctor still persisted in his assertion that it was a genuine case of scirrhus, and manifested quite an interest in the manner of its treatment. He was asked by his friend to call and see for himself the treatment followed and

notice the progress made toward what was unmistakably soon to result in a thorough removal of the malady. He in effect said that it would not do for him to take any steps in that direction, as it would result in bringing down upon him the malediction of his professional friends, or words to that effect.

These are hard sayings but solemn truths. We appeal to all candid people if these things are not a shame and disgrace. It is for this reason that some of our most influential citizens, both male and female, are now inquiring into the truth of what is reported in relation to this whole matter, with a view, if found true, to take such public action or otherwise as will place these things still more prominently before the people.

The Mode of Treatment

Differs in toto from any which has heretofore come under our notice. It is in perfect keeping with the usual practice which physicians all over the civilized world have employed for thousands of years in the general treatment of diseases. There is no pretense, as in Count Mattei's treatment, now so prominent in Europe, of a "vital electric principle," something akin, perhaps, to Keely's "etheric vapor," which the Count claims to "infuse" into his remedies to make them potent. Nor is there any severe treatment with caustics, as is usual with all other practitioners, regular and otherwise. The treatment is usually entirely painless—never anything like evergreen oil. "Specifics" are employed as unguents, simply aided in their penetrating power by the use of a mild galvanic current as a carrier. These, to break down the diseased tissue, while other "specifics" are at the same time employed as alternatives to carry off the effete matter through natural channels, the blood, etc. The treatment assuages rather than induces pain. Every portion of the several remedies employed, whether nuctions or alternatives, is derived either from the vegetable kingdom or from milk. The remedies are also varied according to the locality and different characters of the malady, and all are employed in accordance with general medical practice. Dr. Cook's practice differs from all others—in that she cures while others simply remove. We know of no other treatment where more or less do not return. We have never known a single return in her practice.

A Reality or a Fraud.

The San Francisco cancer cure is a reality or it is a fraud. We holdly assert the former, challenge an inquiry, and in the name of humanity and justice call for an investigation. We don't propose to stop this controversy so long as we live, and are able to wield a pen or utter a word, until some proper and acknowledged authority has investigated and pronounced upon it.

What is called for is simply an investigation into the reality of these asserted remedies by the medical faculty of this city or some other locality. If there is nothing in them, that fact can be readily arrived at. We hold that the cumulative evidence adduced is more than sufficient to warrant an inquiry. The object ought to be one of the highest importance which can interest any city or any people. It is one which means life or death to not less than 600 people in this city alone, who are this day, and every day in the year, suffering from the most dreaded malady with which humanity is afflicted. Fully twenty of these people are dying in San Francisco every month. Is it not the business of our health conservators to look into anything which has even the most distant prospect of deliverance?

But it is a secret remedy and we must not touch it, say our doctors, and when we essay to get some aid for an investigation from a great charitable institution in New York founded by San Francisco benevolence, we are unexpectedly thwarted in our efforts by some "medical friends" in this city, who know nothing about it. Why interfere? We hesitate to give the reason propermost in our mind. What other can be imagined?

It is a secret remedy—so is Keely's—and whenever the faculty will take hold of these as they have of that, and test it as thoroughly as they are doing that, if it proves a success, there are those who stand ready to pledge themselves that it shall be given as freely to the world as Keely's will be given, if it should prove a success. What more can be asked for?

We have taken up the matter of the New York letter because it was at our request that Col. Grannis took an interest in it and wrote to the president of the N. Y. Hospital. He afterward requested the writer of these lines to write to the managing physician, which he did. He wrote a carefully prepared and kindly letter asking for an investigation. But so far no notice has been taken of that communication. And now, since the reply to Col. Grannis has found its way into the public press of this city with editorial comments reflecting somewhat severely upon Dr. Cook, we feel it our duty to write this open letter in answer to Dr. Coe, as he has evidently been misinformed and misled by some San Francisco physicians in reaching his conclusion.

The comments of the *Examiner*, in which paper the letter appeared, we care nothing about, as they will produce no prejudicial effect upon the public of this city, where that paper and the present writer are both well known.

W. B. EWER.
To HENRY C. COE, M. D., attending Surgeon and Secretary of the Board of Managers of the New York National Cancer Hospital.



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Passing Events.

The coast experienced the worst storm of the winter during the past week, and one of the worst we ever had here. The rainfall was excessive, and while it was welcomed in some quarters, it did damage in others. In the southern part of the State and in Arizona, bridges have been washed away, railroads damaged and some towns flooded. At San Francisco, a vessel was wrecked and 18 lives lost, and other craft were injured.

The Debris Commissioners have at last made their report public, and a synopsis is given in another column. It will be necessary to wait for more details in order to understand its full hearing. However, the Commissioners suggest the expenditure of certain sums on the rivers, but as the session of Congress is so nearly over, nothing will be done for the present.

The Governor has signed the bill repealing the Act declaring the Klamath river navigable, so that the miners of that region can now go on with their work with no fear of interruption. A number of other bills in the interest of the miners are still pending.

MECHANICS' INSTITUTE TRUSTEES.—At the election of Trustees of the Mechanics' Institute on Tuesday, the following were declared elected: George E. Dorn, Andrew Wilkie, Irwin C. Stump, Oscar Lewis, Frank Dalton, M. A. Dorn, S. J. Hendy, D. A. Macdonald, John Mallon.

CHIEF OF MINES.—Director-General Davis of the World's Fair has stated that he had definitely settled upon T. J. V. Skiff of Denver as the chief of the mines and mining bureau. Mr. Skiff is a National Commissioner. His selection was made some weeks ago, but the appointment was not made official.

The Mining Interests and the Legislature.

The bill repealing the Act declaring the Klamath river navigable, which passed both houses of the Legislature, has been signed by the Governor, so that hydraulic mining may again go ahead on the upper Klamath.

The bill, which provides that cities or counties which sue persons or corporations of other counties must have the cases tried in other disinterested counties, passed the Assembly but has not yet passed the Senate. It would be of advantage to the hydraulic mining men to have debris suits tried where there is no prejudice.

Senator Campbell of Solano has a bill which provides that all mining companies whose stock is sold at a stock exchange must keep complete books, showing all details of receipts and expenditures and all transfers of stock. These books are to be open to any shareholder. This would only refer to mining companies listed on stock exchanges.

The same Senator has another bill to protect the small stockholder in mining companies and prevent brokers using the stock in elections.

Senator Williams of this city has introduced a bill in which it is declared unlawful for any person, firm, corporation or association to buy or sell, or to offer to buy or sell the, or any of the shares of the capital stock of any corporation in any stock board, stock exchange or stock market under the control of any association.

Another bill by the same gentleman provides that all contracts for the sale or sales made of the capital stock of any corporation or association, or any part thereof, on margin or to be delivered at a future day, are hereby declared to be unlawful.

The remainder of the bill describes in detail the kind of contracts which shall be deemed unlawful.

As will be seen, these last bills are aimed at the mining-stock business in this city.

Besides two bills, a joint resolution was passed by both houses asking Congress to appoint commissioners to come to California, examine our rivers and hydraulic mines and take such action as would enable some of the harmless hydraulic mines to resume operations.

Mines on Odd Sections.

The miners of a portion of Shasta county hold a meeting on Saturday of this week to consider the subject of mining claims on odd sections of land in the mineral belt. Miners of Igo, Horsetown, Muletown, Texas Springs, Centerville, Lower Springs, Shasta, Whiskeytown, Oak Bottom, Tower House, Flat Creek, Motion Creek and Squaw Creek are to be present. Mineral affidavits will be furnished and acknowledged before Justice of the Peace and Notary Public, without charge. Miners now have this opportunity to protect themselves, and unless they make a rally, and do so on this occasion, the mineral lands will be, to a certain extent, barred against them.

The mineral domain of the country is being gradually narrowed, the railroad companies and agricultural claimants taking possession of much that should be left free to prospectors. One main reason for this is that the miners do not take the trouble to refute the affidavits concerning the character of the land. If they have no claims there they let it go, and then, when a patent is granted, the mineral becomes the property of the agricultural claimant.

It was never the intention of the Government to let the railroad companies or individuals have any of the mineral lands of the country. These lands were declared free and open to prospectors under certain restrictions. But many thousands of acres have passed into the hands of private parties—minerals and all. If the miners of each region would band together as the Shasta men propose to do, much of the trouble could be averted, and the mineral lands be kept for those for whom they were intended.

At Mare Island Navy Yard the last stone has been put in place on one of the greatest dry-docks in the world. The work has cost nearly \$3,000,000 and has been carried on under the professional supervision of Engineer Walcott. The dock has been in use for some time and has received some of the largest warships of England and France, which have accepted its hospitalities for the purpose of cleaning and repairs.

Tug-Boat Charges.

The events of the week, in connection with the storm and shipwreck on the coast, bring into prominence the tug-boats of the bay and their methods of operation. It seems that while they make a good deal of money out of shipping when the ships are prosperous, they are apt to make a great deal more when the ships are in distress. This is a great commercial community, having much to do with shipping, and we have one of the finest harbors in the world; but the harbor has got into disrepute with shipmasters and owners on account of the excessive harbor charges of various kinds, among which are included expenses of tug-boats. These charges are less now than there is competition, but there is still room for great improvement.

One custom which is a bad one is that of the tug taking the ship's hawser instead of giving its own hawser for towing. The boat, the engine and the hawser are the three essentials of a tug-boat, but when they engage to tow a ship they do not furnish the hawser unless paid extra for it.

This is all wrong. The tug ought to be compelled to furnish all the necessary appliances for towing, of which the hawser is one of the most important. When a man hires a horse and buggy ashore, he expects the traces to be furnished with the outfit. The case is parallel in hiring a tug-boat.

When the tug took hold of the ill-fated Elizabeth off Lime Point and began to tow, the hawser (which in this case belonged to the tug) broke. After some time it was again passed to the ship, and when off Point Bonita it again parted, the ship went adrift and struck on the four-fathom bank of the bar, where she lost her rudder and was subsequently wrecked and 18 lives lost, including the captain.

Now what business has a tug-boat to have a hawser which she can break under any circumstances? It ought to be big and strong enough to stand more strain than the tug could put on it. If the tug can break it, she ought to be liable for all damages resulting from the breaking.

One tug-boat captain refused to take the lifeboat in tow out to the distressed ship, and another captain took the lifeboat in tow on the return, started up quickly, capsized the boat, by which means one man was drowned, and then the tug went on her way without assisting in an attempt to save the life of the lifeboat captain.

This is not a very nice record for the tugs in the Elizabeth case. Finally two got hold of her, but could not keep her off the rocks and she was lost.

On the same day the Jessomina struck on the same shoal part of the bar in attempting to leave the port after an unsuccessful attempt to enter and brought up down near Point Reyes in a dangerous position. For 36 hours she lay there in sight of the lighthouse, signaling for a tug, but no attention was paid to her signals by the lighthouse men though word was sent by a fisherman. Finally a tug did come and demanded \$12,000 from the captain to save his ship. The captain offered \$6,000, but the tug refused and the ship had to pay the \$12,000.

If this is not legalized highway robbery, it is the next thing to it. Such a demand made, under the circumstances, when the ship captain could not refuse, ought not to be allowed by the courts. It is a disgrace to the community that such things can be permitted. Double or treble the usual prices for towing or many times the cost might be charged, but such extortion by a tug-boat should not be permitted.

These things are decidedly bad for the reputation of the port and the community. The ghoulish action of the men on the Marin county shore in refusing to lend horses to the life-boat men to haul their rocket apparatus to the wreck; in refusing to send the saved men to town in a wagon; in refusing to help search for the bodies and in helping themselves to all they could find, is no worse than the action of the tug men of this side of the bay, unparalleled as it would seem to be.

The government spent great sums and much time in breaking up the wrecking gangs on the Eastern coast, and has established life-saving stations to help the distressed mariner. But these instances here show man's inhumanity to man in a strong light. The poor people of a coast line may have some excuse in poverty for

robbing shipwrecked sailors, but there can be no such excuse for the tug-boat owners, and their actions are not much better than those of the common wrecker. If a certain sum is not paid them, far in excess of what is usually demanded, then the ship can sink for all they care. It is trading on the necessities of a class which is put a stop to in all other occupations where it is possible. If there are authorities who can regulate these things, now is a very good time to begin to regulate them. If the State has jurisdiction, the Harbor Commissioners ought to take cognizance of these events. If not, the Government officials, who haul up poor Jack if he mutinies, or take away the license of a ferry captain for a collision, might turn their attention to the actions of the tug-boat men. If these things have grown up by custom, it is time to stop the custom, which is a bad one.

Heavy Coal Receipts.

The receipts of coal at this port for the past week aggregated 71,052 tons—the largest quantity on record in the same space of time. Of this, 46,223 tons were from foreign sources, 27,175 tons from Australia, 16,834 tons from Liverpool and 2219 tons from Glasgow. The Pacific Coast coal amounted to 20,888 tons, and that from Atlantic ports 3940 tons.

San Francisco is rapidly increasing in importance as a coal-distributing center and also as a point for its consumption. The figures given will, however, show how much we have to depend upon foreign coals. Very little comparatively comes from Atlantic ports. A large portion of what is known as coast coal is really foreign, coming as it does from British Columbia.

Last week the prices of coal dropped materially, and, under the heavy receipts, a still further reduction in prices has occurred. It is stated also that prices even lower than published quotations may be had by large buyers who take coal from the ship's side.

The manufacturing interests are greatly benefited by these liberal receipts of coal. One great drawback to manufacturing in this State has been the excessive cost of coal as compared with other centers. But as the commerce of the port increases, and more steam and sailing vessels come here, the coal receipts increase and cost lessens. One vessel that came this week had to sell her coal for less than it cost, she having arrived on a low market.

Our coast collieries also are increasing their outputs, and more mines are being opened. Many small veins of lignite have been found on the coast of late which furnish product for local consumption, which is a great help to interior towns.

Imprisoned in a Mine.

Five Hungarian miners were rescued alive from the ill-fated slope No. 1 at Jeannesville, Pa., after having been imprisoned 18 days. How they survived is a miracle. Nothing like it has been known or heard of in the Pennsylvania fields. While two men were searching in a braid of the east gateway, they came across the five Hungarians huddled closely together and almost dead. They were so weak, with but one exception, they could not be moved. Doctors were at once summoned, and a large stock of blankets taken down. Careful nursing will be given them, and every effort put forth to save their lives. The searchers say that their attention was attracted about 9 o'clock by a slight tapping on the walls, and, working in that direction, they finally came upon the men. John Tomakusky had been endeavoring to make himself heard, and, in a faint voice, informed them that he and the others were almost dead from hunger and cold. It was not long before the men were reached.

Tomakusky, when partially revived, said the contents of their dinner-pails kept them alive for six days. Then they lived on the oil from their lamps and bottles. After that was exhausted they drank dark, sulphurous water. The 13 bodies of the men who were killed in the mine have been found. These five miners were those unaccounted for.

"DIAMOND" JOE REYNOLDS, the Chicago millionaire who owned the Congress mine, Arizona, died on Saturday last. He had many heavy mining investments near Prescott and his death is quite a loss to that section.

Our Rivers.

The Army Board appointed to make a preliminary examination of the Sacramento and Feather rivers, and the Debris Commission of engineers appointed to investigate the debris question, as far as it affected our rivers, have both made reports to the Secretary of War, and through him to Congress.

The first board summarizes recommendations as far as they relate to appropriations as follows:

1. A permanent yearly appropriation, not to exceed \$25,000, for the improvement and conservation of channels and banks, by use of a snag-boat and crew, on the Sacramento river above the city of Sacramento.
2. A specific appropriation of \$275,000 for removal of obstructions in the Lower Sacramento, and \$25,000 for the closure of Jacob's slough, on the east bank of the Sacramento, above the city of Sacramento.
3. A specific appropriation of \$300,000 for treatment of the Yuba near and above Marysville.
4. A specific annual expenditure of \$20,000 for improvement of the navigable channel of the Feather river.
5. In closing this report, the board desires to say that a levee system, in great part already existing, needs to be projected and completed for the Feather river, in order to secure the maximum improvement of which it is capable.

The Debris Commission's report is given in brief elsewhere in this number of the PRESS. They, too, suggest certain expenditures to improve the rivers.

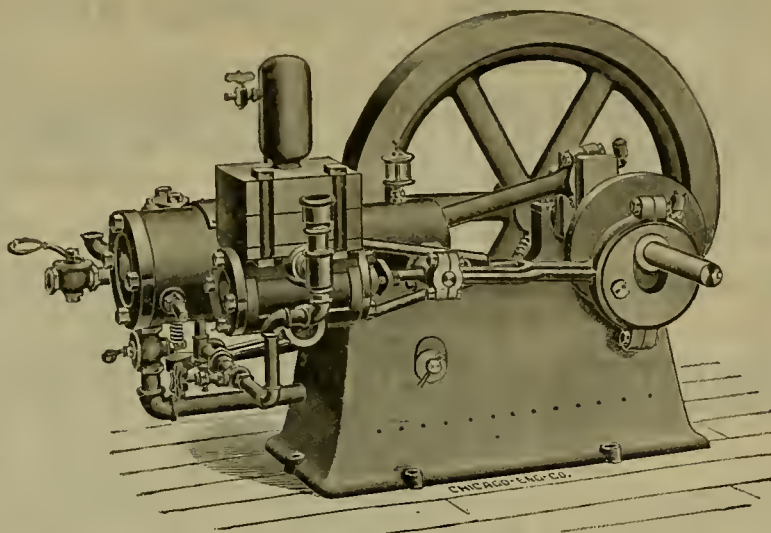
However, Congress has done nothing and will do nothing this year. One of our Representatives has telegraphed that our rivers and harbors will receive nothing at all at the hands of this Congress.

Meantime come of the rivers, freed from congressional control, are doing as they please, and not being able to carry the storm waters comfortably, are carrying away bridges, washing away land, destroying railroad embankments, and doing whatever damage they conveniently can. It seems very difficult for us to get Congress to pay much attention to improving the water-courses in the State of California. Probably the State is not of sufficient political importance to warrant much expenditure in that direction. The Government does not need to heed the advice of its own engineers or the desires of the inhabitants of this section.

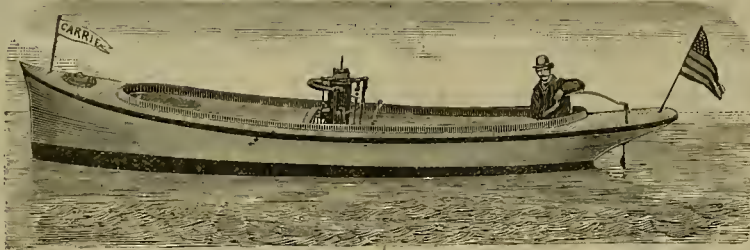
Ventilating Quartz Mines.

In an investigation before the "Ventilation of Mines Board," Victoria, John Harvey, manager of the New Chum United gold mine, described the system of ventilating that mine to the bottom of the 1900-foot shaft. The sketch shows a section of the mine. A is a winze sunk on the eastern reef; B, winze sunk straight down in center of country to reef, then underlay with eastern reef; C, winze sunk on east leg of reef; D, winze sunk for prospecting and ventilation of mine; E, winze or small stope underlaying to west; F, winze now being sunk; G, saddle reef worked out; H, reefs not worked; P, pent-house on shaft and oisterne on it for supplying tanks with water. The mine is connected with New Chum Consolidated at No. 8. The air comes in at this level, goes down the winze and up through the shaft. The whole of the shaft is upcast; nothing comes down the shaft from the upper levels.

At this same investigation a patent ventilator of the Victorian Atmospheric Refrigerating Co. was examined and described. It is shown in the accompanying cut. The actual patent is an injector fan. It is actually a syphon system for air instead of water or steam. The circular motion is given by the small force inserted above the fan on the turbine wheel—a small jet of water as big as a darning-needle will drive one big enough for ventilating a room. As that rushes through it causes a vacuum. It should be, as the circular motion is imparted to the machine below the ceiling, the vacuum is caused by the air rushing through the open mouth at right angles. The air-pipe, presuming it is used as an exhaust, would be attached immediately below the machine, but in using it as a ventilator, for driving the air in it would be reversed. With reference to mines, it must be done by exhaust, a main shaft or pipe carried down the mine, and the machine working above outside the mine, and branches taken away close home to the workings. It is claimed that 9000 feet per minute is obtained by a two-foot machine. For deep mines a larger one



THE REGAN VAPOR PUMPING OUTFIT.



REGAN VAPOR ENGINE IN LAUNCH.

would be necessary. It can be worked by water or steam and is in use in a number of places in Victorian gold fields.

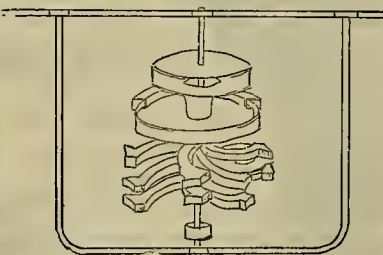
The Regan Vapor Engine.

The Regan vapor engine is operated by means of vapor, being drawn into the cylinder by the suction of the piston and ignited by an electric spark. The carburetor contains a small quantity of gasoline; this carburetor is connected with the engine by a pipe. At each revolution of the flywheel a current of cool air is drawn through the carburetor and into the cylinder. In passing through the carburetor, it vaporizes a quantity of the gasoline; this, when mixed with more air drawn through the pipe and air valve, forms the charge upon which the combustion develops the power.

There is no fire, boiler, steam, coal, ashes, or anything of that kind, connected with the engine. There being no steam used, licensed engineers are not necessary when the engine is used in boats. Neither does it take a skilled engineer to run the engine, for owing to the mechanical construction of the engine, the operation is automatic and no attention is required other than to keep the carburetor properly supplied with oil.

These engines will also run with illuminating gas or natural gas. They are adapted for electric light plants or country houses, mills, shops and hotels, and for all ordinary purposes for which an engine is used. The cut given herewith shows a cheap and convenient pumping plant for irrigation, elevator work and household purposes. This outfit does away with the necessity of belting or shafting, and the pump is arranged so as to change the stroke to meet any required elevation, or to throw the pump off altogether and use the engine for power. This is the latest improved form of the Regan vapor engine.

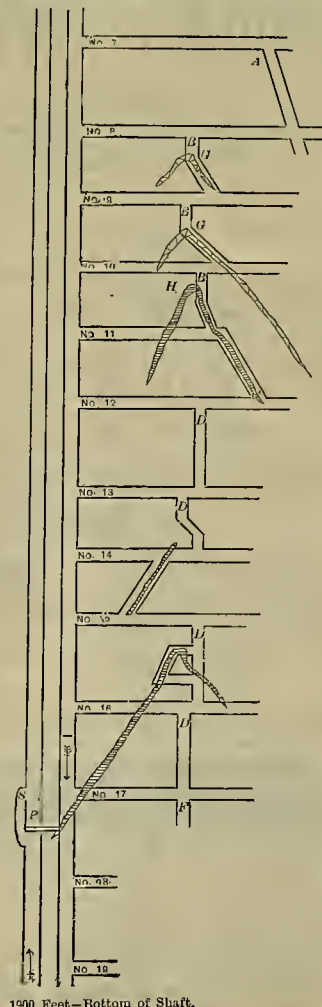
The other engraving shows the engine applied to a small launch. There is no delay in starting to get up steam, but the heat is ready for use at any time and plenty of power is developed for the purpose of propulsion. The boat engines are of vertical type. The Regan Vapor Engine Co. of this city furnishes engines and pumping outfits, launches, boats, canoes, etc.



VENTILATOR FOR EXHAUSTING AIR.

oped for the purpose of propulsion. The boat engines are of vertical type. The Regan Vapor Engine Co. of this city furnishes engines and pumping outfits, launches, boats, canoes, etc.

THE extensive circulation and prominence given to the State horticultural and viticultural interests by "California on Wheels" have caused the inception of a novel scheme which will shortly be carried into effect. The plan, which was conceived in this city, is to run a well-fitted car through the towns of Oregon, Washington, Montana, Idaho, and the States



1900 Feet—Bottom of Shaft.

VENTILATING A DEEP MINE.

and Territories west of the Missouri, containing samples of the manufactured products of our State.

The Government Commission and Debris.

The Secretary of War has filed the report of the Commission appointed by the Act of Congress in 1888 to examine hydraulic mining in California and report upon the losses sustained by the deposit of debris in streams. The examination was begun in the spring of 1889 and concluded in the fall of last year. There is a full description of hydraulic mining in the upper and Sierra districts and a review of its progress and results, and the law suppressing the dumping of refuse matter is given. There are also tabulated statements showing the depth of deposits of debris at different points as compiled by the State authorities and others interested in the controversy between the miners and farmers.

The report is signed by Lieutenant-Colonel W. H. Bagnard and Major Thomas H. Henry. The board caused an examination to be made of the injured lands bordering on the Feather, Yuba, Sacramento, American and San Joaquin rivers and their tributaries, and surveys were made of the channels of the Sacramento and Feather rivers. Assisted were sent into the field for the purpose of examining the canyon of the different rivers and their tributaries into which debris was dumped, and surveys were made of selected sites for debris dams. The particular sections visited were those which had been the scene of former mining operations on a large scale or which represented typical mining districts.

The concluding remarks of the Commission are as follows: "The duty devolving upon the board is to ascertain if some plan cannot be devised whereby the present conflict between the miners and farmers can be adjusted in order that the hydraulic-mining industry can again be carried on without injury to the farming interests and the navigation of rivers. It is not apparent that any expression of opinion or recommendation will have any effect in rehabilitating the industry in the present legal status of the question. Without some modification of the existing conditions, hydraulic mining must cease. It cannot be carried on without violating the decrees of the courts.

"If, however, by a reversal of the opinion of the courts, or by other means, hydraulic mining can be permitted in whole or in part, or if without such reversal, an expression of opinion is required as to the feasibility of impounding mining debris, the board will state that the investigation and examinations made indicate that in isolated cases it is possible to impound debris without injury; also that locations exist in the canyons of different mining streams in the Sierra district where permanent stone dams, properly constructed, will retain large quantities of material of a character formerly mined out, and which has caused the destruction of farming lands and injured the navigation of rivers. These dams, however, will not be effective in impounding all the material delivered into the canyon from the mines. Being in streams and in the pathway of freshets, portions of the heavier material will be carried over the crests of the dams, to eventually find a lodgment in the river below. The finer sands and clays cannot be effectually impounded by such barriers, but will be carried off in suspension. With the improved condition which it is desired to give to navigable rivers, it is probable that the greater part of this finer material can be carried off without being productive of harm. The construction of dams called for being entirely in the interests of the miners, the cost thereof should be borne by the individuals interested in mining.

"The navigation of rivers in the Sacramento valley has been injured by the operations of hydraulic mining. The injury has been caused by the deposition of vast quantities of mining debris in beds. In addition, there are vast deposits of material lying in the canyon and in the plains below the foothills, portions of which will be carried down during the floods, and eventually lodge in these streams.

"It is proposed to improve the rivers, first, by restraining debris now lodged in the canyon of the Yuba and Bear, and in the plains below by dams and other restraining works; second, by contracting the width of the rivers by brushing dams in their beds. The system of restraint will be continued until the rivers in their improved condition can carry the material brought down.

"The estimates of these improvements are: Feather river wing dam, \$300,000; Sacramento river wing dam, \$300,000; dam on Yuba river at Deguerre point from \$300,000 to \$640,000, according to height; dam on the Bear river at Van Yeeens, \$150,000; restriction works on the Yuba below the foothills, \$300,000, including an annual amount of \$20,000 for maintaining navigation on the Feather river, while the above proposed works are in course of construction."

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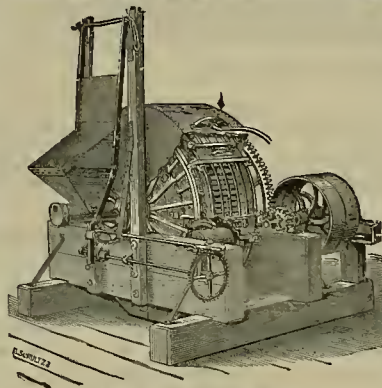
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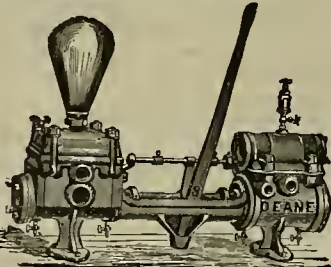
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List of U. S. Patents for Pacific Coast Inventors.

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FOR WEEK ENDING FEB. 17, 1891.

- 446,702.—MAILING MACHINE—G. B. Baer, Liverdale, Cal.
- 446,421.—SKATE—S. S. Black, Pasadena, Cal.
- 446,660.—CARBON FOR ELECTRIC LAMPS—W. J. Burns, Los Angeles, Cal.
- 446,630.—WINDMILL—W. M. Craig, Santa Fe, Cal.
- 446,585.—VENEER-CUTTING MACHINE—E. Densmore, Coronado, Cal.
- 446,439.—CARD-EXHIBITING DEVICE—J. W. Lawler, Sr. and Jr., Burbank, Cal.
- 446,445.—FLOOR-WASHING MACHINE—Lizzie Graham, Portland, Or.
- 446,559.—VEHICLE WHEEL—R. E. Jeffrey, Grass Valley, Cal.
- 446,755.—FISH-NET—L. A. Johnson, S. F.
- 446,756.—INDEX—W. A. Judge, Santa Barbara, Cal.
- 446,524.—PANORAMIC DEVICE—E. W. Keeler, S. F.
- 446,600.—WIRING ATTACHMENT FOR BALING PRESSES—J. H. Kruse, Portland, Or.
- 446,530.—APPARATUS FOR DELIVERING CLAY TO PRESSES—E. T. Mapel, Alameda, Cal.
- 446,603.—SOFA BED—A. G. Phillips, S. F.
- 446,745.—HOSE REEL—W. T. Y. Schenck, S. F.
- 446,763.—RAILWAY RAIL JOINT—J. B. Walker, Corvallis, Or.
- 446,495.—MAILING MACHINE—S. B. Whiteside, S. F.
- 446,654.—COMPOUND FOR PAVING, ETC.—H. F. Williams, S. F.

The following brief list by telegraph, for Feb. 24, will appear more complete on receipt of mail advices:

California.—Josiah Babcock, San Jose, positive shuttle motion for looms; Otto A. Drew, San Francisco, set trigger; Edgar W. Burnham, San Diego, music-leaf turner; I. L. Murrell, San Francisco, fire-proof paint; John C. Miller, San Francisco, annunciator and indicator system; John F. Millerich, San Francisco, gate; James W. Perkins, San Jose, machine for making compound paper and jute twine; John F. Sweeney, San Francisco, perch for birdcage; H. Sweet, Los Angeles, metallic railway tie and chair, and metallic roadbed draw and safety tie; Edgar Thompson, San Francisco, assignor to Pacific Engine Company of California, engine governor; George C. Watriss and C. J. Knighin, San Francisco, cable railway; John Weichhart, San Francisco, machine for forming sheet metal lathing.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

PANORAMIC DEVICE.—Ezra W. Keeler, S. F. No. 446,524. Dated Feb. 17, 1891. This arrangement for panoramic or other views is designed to give a continuous and constantly changing vista through an indefinite number of arcs of circles so constructed that they may form parts of various figures, such as octagons, figures of eight, or other irregular forms for maintaining the same angle of light upon the picture and an exact visual distance from the beholder at all angles, and, in connection with this device, the inventor employs a series of cars, platforms, floats or movable supports, peculiarly constructed to contain the beholders and to be propelled by any suitable mechanical device, together with other mechanical effects. Interior to the arcs on the walls of the building, and corresponding to them in curvature and at a sufficient distance from the surfaces to give the proper visual angle, is arranged the railway on which suitably disposed cars or platforms are designed to travel. The design of the device is to have the arcs of such a curvature that each scene will be measurably separated from the adjacent ones while at the same time all the scenes are in a manner continuous so that sections of a country or views may be shown one after the other and conveniently inspected by passengers in the cars without fatigue. This will insure also the transportation of a great number of people through the building without any unnecessary delay or crowding.

SOFA-BED.—Andrew G. Phillips, S. F. No. 446,603. Dated Feb. 17, 1891. This improvement in sofa-beds or bed-lounges consists of the novel locks for holding the hinged or swinging back in an upright position, for use as a sofa or lounge, and for releasing it so that it may be turned down to a horizontal position for use as a bed. It further consists in combination with said locks, of the swinging, supporting bars of the back, their sliding connection with the back and the gravity legs of said back, which when extended are held securely by the ends of the supporting bars. The object of this invention is to cheapen the construction of this class of furniture.

WIRING ATTACHMENT FOR BALING PRESSES.—John H. Kruse, Portland, Or. No. 446,600. Dated Feb. 17, 1891. This invention relates to the class of devices for wiring bales of material within the press, and it consists in certain novel arrangements and constructions intended to provide a simple and effective device of this class.

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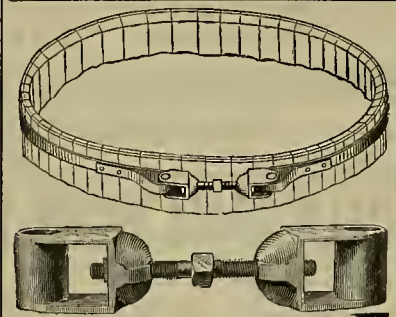
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COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodysier, Mining and Civil Engineer, formerly of the California State Geological Survey.

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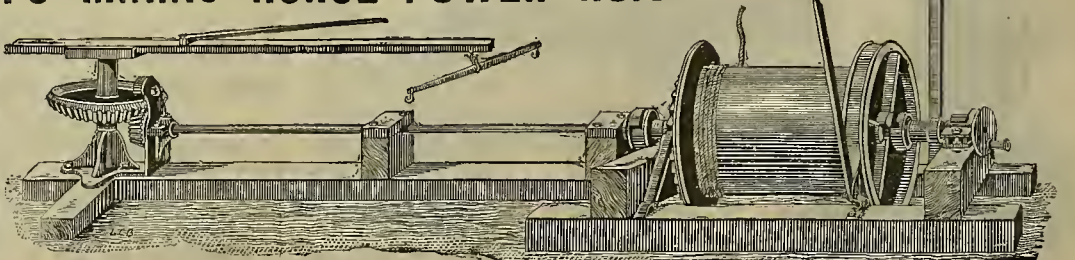
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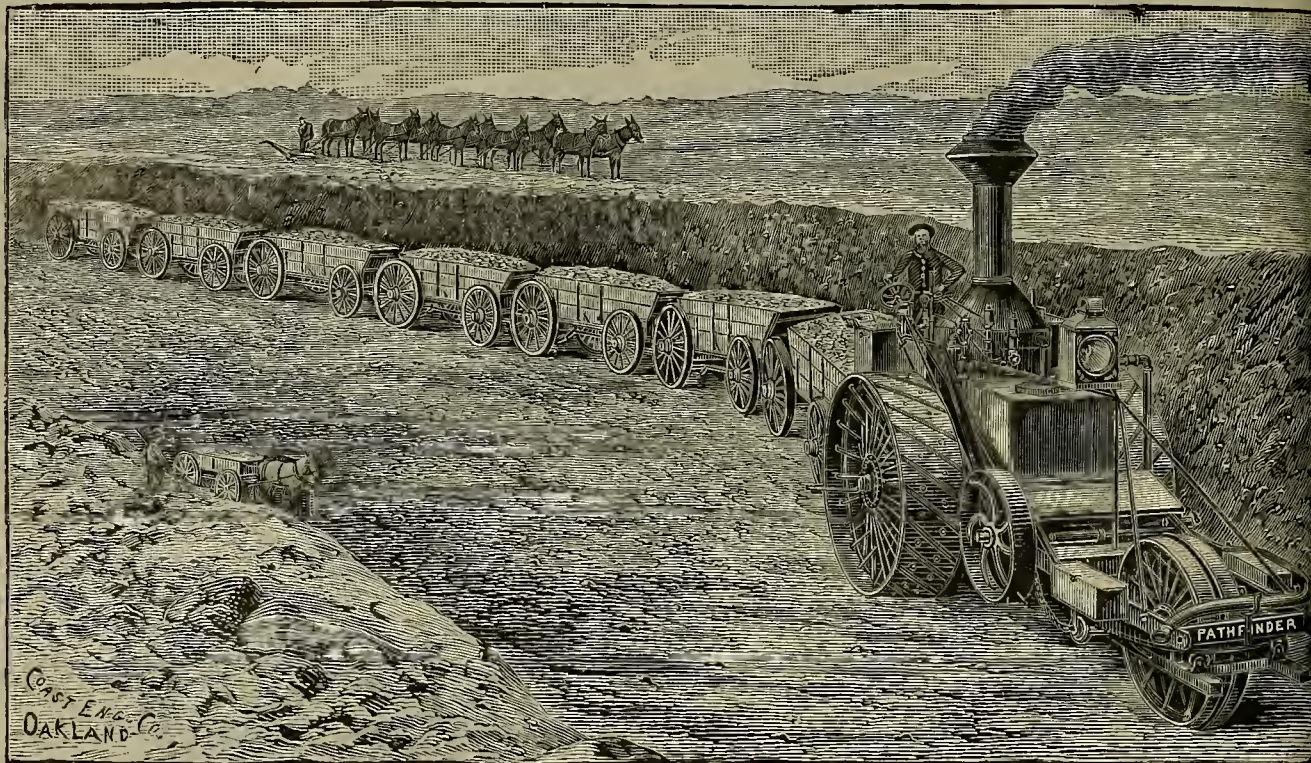
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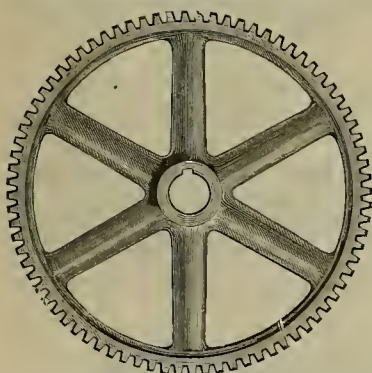
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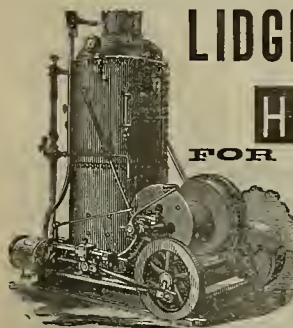
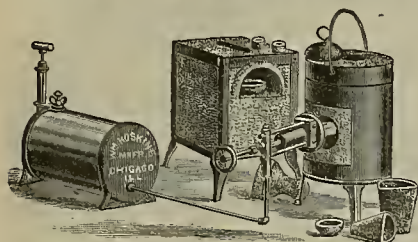
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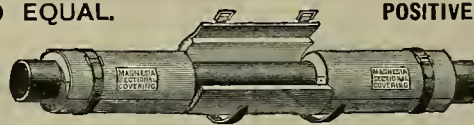
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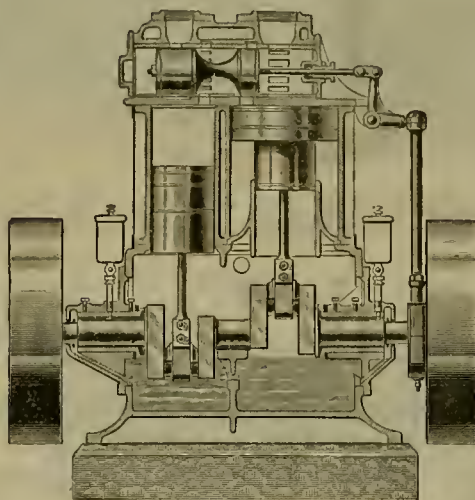
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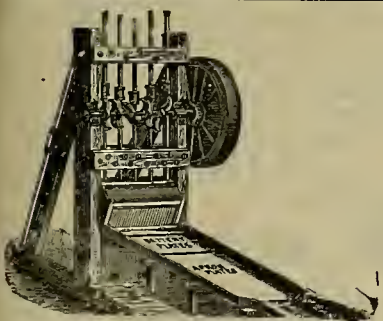
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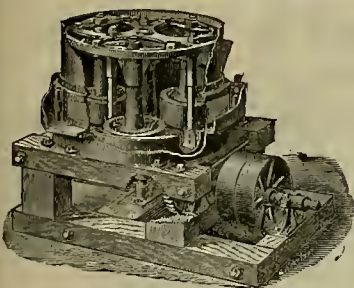
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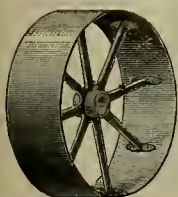
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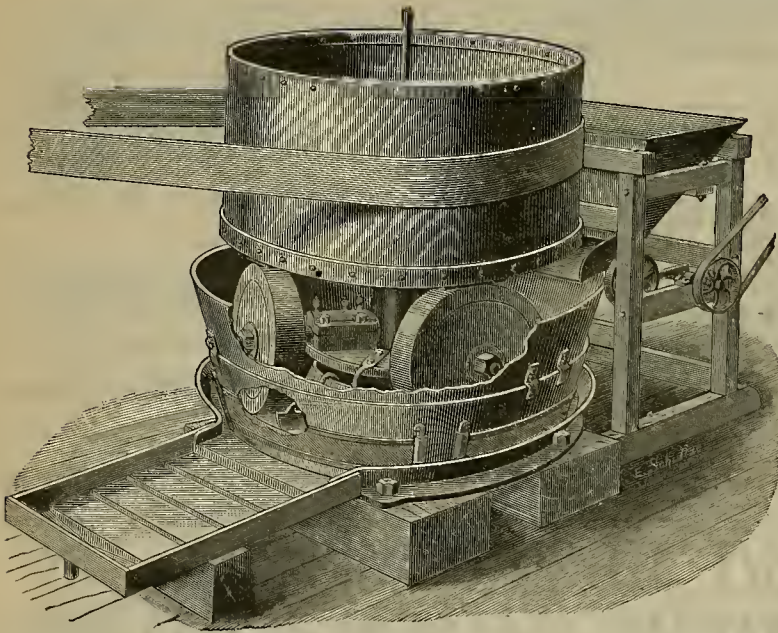
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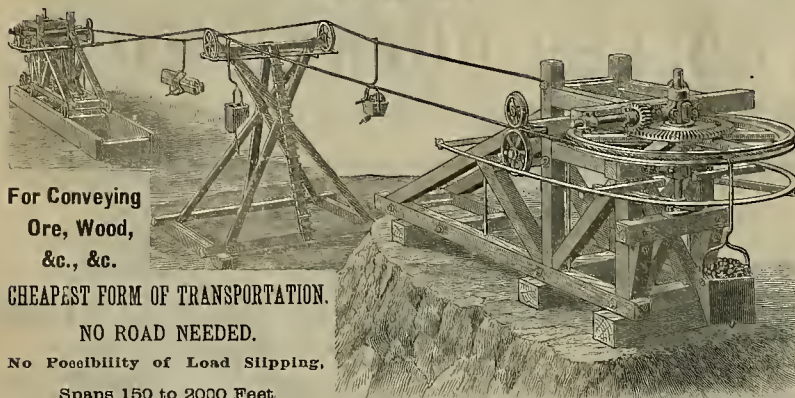
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An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXII.—Number 10.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, MARCH 7, 1891.

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The ore-crushing capacity of rolls depends on their diameter, speed, and the size and hardness of the material fed to them and on the opening between their crushing surfaces, as well as the regularity of feed. If the pieces fed to the rolls are small compared with the roll diameter, the speed of the rolls may be increased. On the other hand, the quantity crushed will be greater the farther the rolls are apart. The power required for coarse crushing will be much less than for fine.

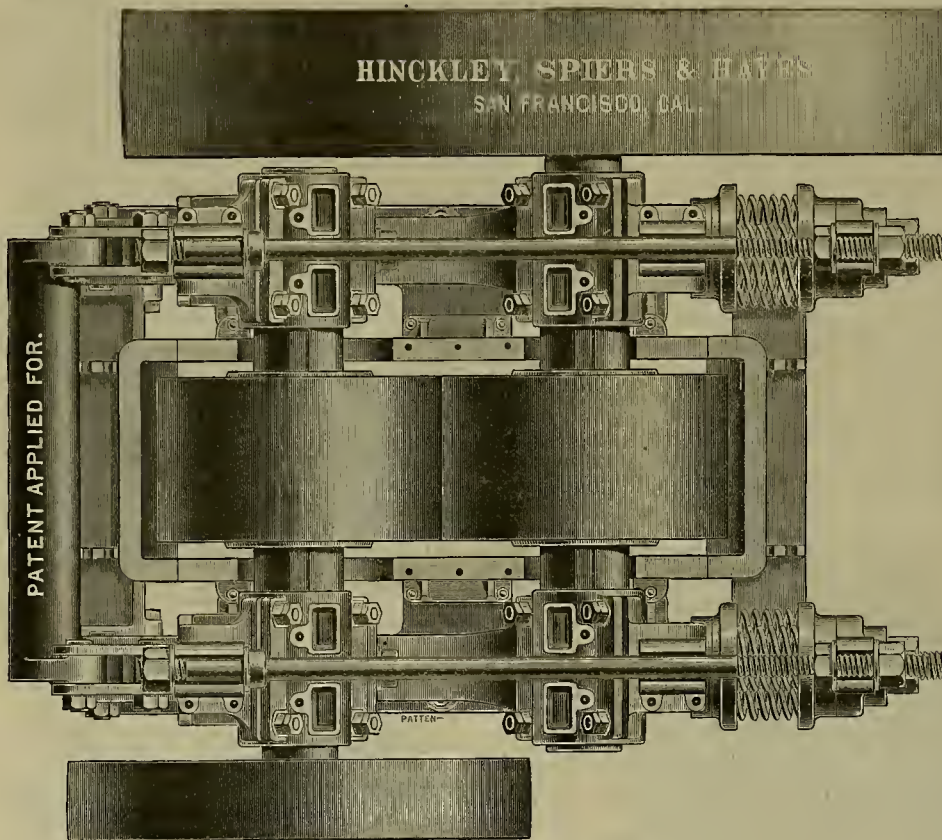
The patent rolls shown in elevation and plan in the engravings on this page are designed to withstand the severest strains which have to be met in dry crushing of ores. The patent equalizing bar causes the sliding bearing of the rolls always to move equally and to remain in line. There is also a very effective patented method of securing the shells. This method of fastening requires no conical bore of the roll shells, consequently they can be more easily and quickly replaced when worn out, while the advantage of lateral adjustment is also secured without disturbing the roll center on the shaft.

For the heaviest work, the roll shafts are made of steel and the rolls are driven direct by pulleys without the use of gearing.

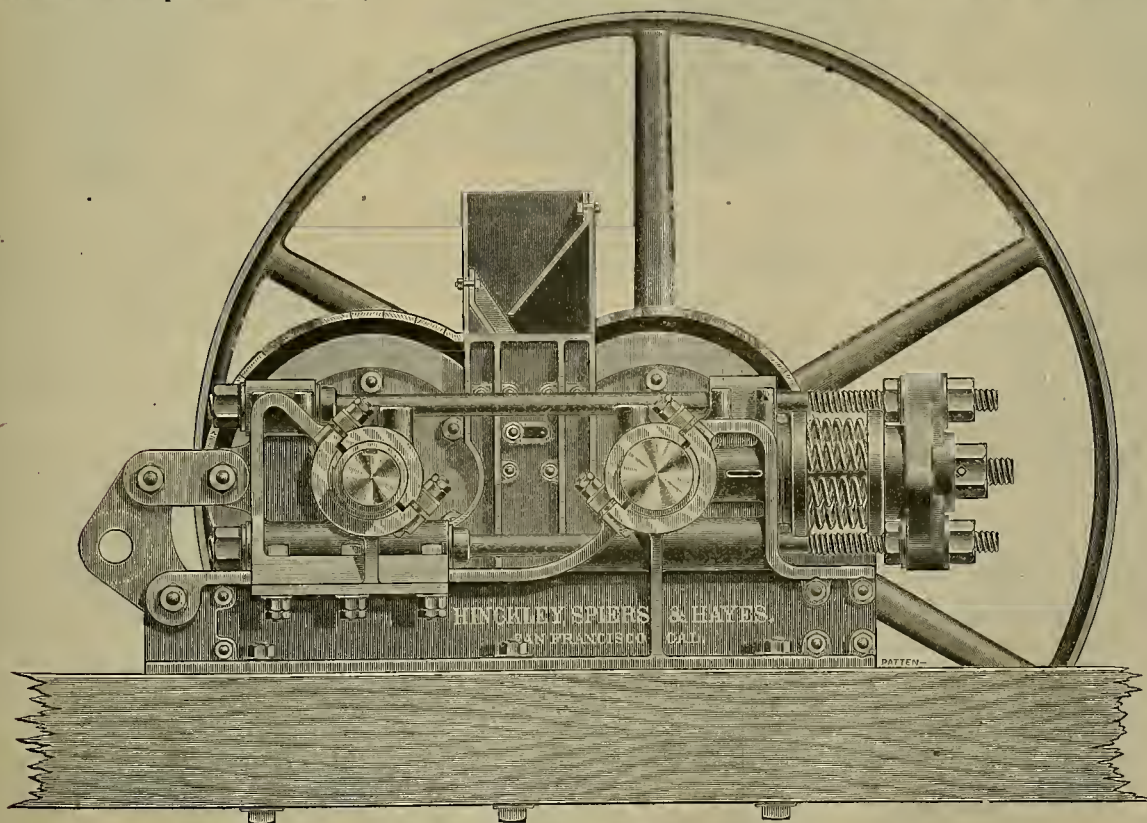
The frame has planed lugs for attaching a slide-rest to true up the worn roll-shells.

The rolls shown in the engraving are equipped for dry-crushing. Dry fine-crushing rolls require the highest class of workmanship and material. The roll-shells should be of mild steel perfectly homogeneous.

The high class wet-crushing rolls are similar to the dry-crushing style, but the dust shrouding is omitted and scrapers fitted to automati-



PLAN FOR DRY CRUSHING ROLLS.



HIGH CLASS ROLLS FOR ORE-CRUSHING.

cally clean the crushing surfaces before they come into action. These rolls are made by the Fulton Iron Works of this city.

Good for a New Mine.

The Smith mine at West Point, Calaveras county, briefly described by our correspondent in another column of this number of the PRESS, is a new claim which has only been operated for about 45 days. They sent about 9000 pounds of the ore down to the Selby Works recently that yielded \$125 per ton. A second batch of 9400 pounds sent to Thos. Price of this city was crushed, sampled and sold on a basis of value of \$141.30 per ton, of which \$132.30 was gold. The last ore taken out assayed \$189 per ton.

The vein has been stripped for 35 feet and averages about 25 inches in width. The shaft is down 118 feet, and this ore was taken out in sinking it. The vein is a strong one, between talc and granite.

The new shaft going down is 4x8 feet in the clear, timbered with 10x12 timbers. New hoisting works and hoiler have been provided, as well as a 6-inch pump, there being considerable water. Robert Smith, formerly of the Lone Star, is foreman, and the mine is owned by Tibbey & Porterfield. There is no mill as yet, but one will be put up when the mine itself furnishes the necessary money to pay for it, as is confidently expected.

THE coinage at the local Mint during the month of February was: Double eagles, \$3,180,000; standard dollars, \$685,000—a total of \$3,865,000.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Tuolumne County Mining Interests.

[From Our Traveling Correspondent.]

Golden Gate.

This property is to-day the leading mine of the county. The mine may be said to adjoin Sonora, being but a few minutes drive from the city. Mr. E. C. Loftus, the superintendent, has labored continuously to place the property on a sound paying basis. At the time of my visit he was about to realize the dreams due to his management. The old plant is giving way to one better adapted to the present condition of the mine, and the more rapid and economical working of the ores. The hoist is being exchanged for a double reel and gear-hoist capable of hoisting from a depth of 1500 feet. The hoists of the Risdon Iron Works manufacture, which alone is a sufficient guarantee of its perfection.

The entire plant is lighted by electricity under the Edison patent with a capacity of 65 lights. Additional water for power is now being brought in through a half mile of pipe 22 inches in diameter at receiving end, and 14 inches at point of discharge. This pipe system will give 300 feet of pressure and very materially lessen the operating expenses, while increasing the efficacy of the plant. In addition to this, there is a completed steam plant that can be connected at any time should the water fail. The free water of a creek that passes over the company's property is turned on to a water-wheel, and with but 33 feet of pressure the average flow of 200 inches of water furnishes sufficient power to run the mill. The power is conveyed by rope 200 feet to the mill. The mill is of ten stamps with concentrators and canvas tables. Owing to the very high grade of the sulphurets the rock from the mine is now selected and the best, when crushed, run into settling tanks and the entire body chlorinated. The average ore is crushed and free gold caught in battery and on plates. The concentrates are saved by concentrators and canvas tables and the concentrates chlorinated. Mr. Loftus has added a chlorination plant for the treatment of the mine's ore, thus making the plant complete within itself. The shaft is now down 300 feet, with drifts run 500 feet on the vein. The entire distance is in ore, showing an unbroken ore body of an average width of 6½ feet, carrying an average of \$2 a ton in fine gold and 2½ to 3 per cent of sulphurets of an average value of \$420 a ton. The mine will soon be complete in every department and will well repay a visit of inspection, while the affable as well as competent superintendent will make it one of pleasure and profit.

San Giuseppe.

This mine is owned by ex-Gov. G. O. Perkins, A. Haley and M. Griffith, with Mr. W. G. Whorf, formerly of Arizona, as superintendent. The property is located within the city limits of Sonora. The shaft is now down 230 feet, with drifts run 200 feet, all in ore. The vein has an average width of 14 inches. The vein-matter carries \$1 a ton in free gold and 2½ per cent of sulphurets that go \$1600 to the ton. The ore extracted is being piled up until the mine shall reach that point where sufficient ore will be in sight to guarantee the continuous operation of a fair-sized plant. Mr. Whorf is to be commended for his conservative plan of operating. If there were more like him there would be fewer failures to record. By thorough development and the securing of large ore reserves in advance, the mine can be operated on a much more extensive scale and by reason of reserves created produce sufficient ore to supply a mill of twice the capacity that could otherwise be supplied from so small a vein, and thus not only double the output but greatly lessen the working expenses of the mine. The San Giuseppe has the reputation of yielding the finest gold of any mine in the State, if not in the world, the average fineness of the gold being .996. Mr. Whorf is gradually getting the mine in shape, and a year from now will no doubt show the San Giuseppe equipped and in successful operation.

The Bonanza.

"The boys" have got down 900 feet on the vein and lately have encountered a small bonanza in what might be termed the gangue of the vein. As it is not in place, the superintendent, Mr. Oliver, does not attach the same importance to the find that he would if it occurred in the vein proper. Since the first of February \$1400 has been taken out and the product is not exhausted. In addition to this shaft the company has leased the extension, which they are operating by tunnel. The formation is here the same as that in the shaft, and the finding of gold leads the company to believe that "the stuff" is there once they get to it.

In addition to the Bonanza, which your readers are aware is situated in the heart of the city of Sonora, Mr. Oliver is operating in Saw Mill Flat, about half-way between Sonora and Columbia. With his usual luck (or rather pluck) he has struck it here too and extracted some \$5000, when the works ceased, just as they were in sight of bonanzas. The works are being reopened and the last bonanza will soon be recovered.

Mason Chlorination Works.

This plant was formerly "The Maltman." Mr. L. Mason is now the owner. He has

engaged the services of a reliable, competent chlorinator, which, added to Mr. Mason's well-known reputation for honesty, will soon give the works all the ore they can handle. The capacity of the plant is 2½ tons a day. The charges are \$20 a ton, less 10 per cent for loss on average ore. The works are situated just at the edge of Sonora, and are a great convenience to the mine-owners of the county.

Belle View.

This mine was formerly known as the Hyde mine. The property is at present operated by Mr. Jno. W. C. Maxwell. In the past, several companies took hold of the mine, and after expending considerable money in development or equipment allowed their bonds to lapse and the property to go back to its owner. Mr. Maxwell purchased outright and has now equipped the mine in an exceptionally fine manner, and the returns are said to be more than satisfactory. The vein at 200 feet is 20 feet in width of rock running well in gold, besides a good per cent of high-grade sulphurets. The mill is a "daisy," being none other than one-half of the famous Josephine mill. It is seldom that such fine machinery is used in mining plants. The mill is of ten stamps, with one Frue and one Woodbury concentrator. Two additional Woodbury concentrators have been ordered. With three Woodburys to the ten stamps the plant will be complete.

I would add that at the time of my visit the superintendent and foreman were both absent, and in consequence I could not gather the information I desired. Should the reader visit the mine, I would advise him to arrange to call during the presence of the superintendent or make arrangement for his own entertainment.

While at the Belle View I met the intelligent engineer formerly of the famous Josephine of Grub Gulch, Fresno county. From him I learned that the published statements in regard to the Josephine are in error. He states that the mine during the two years that it was in operation paid over \$200,000 in dividends; eventually the profits decreased to \$1200 a month. As this was not thought worth bothering about by the worthy Rothschild's syndicate, the mine was ordered closed and the plant sold.

Soulebyville.

The Souleby mine, that for many years poured out a steady stream of the golden metal, is at present idle through want of capital to explore the virgin territory contained within the mine's limits.

The old workings extended to a depth of 900 feet within an average vein of 15 inches that milled \$35 a ton on the average. The last work was a drift started to cut a body of \$45 ore; before the drift was completed the mine was shut down and the ore body abandoned. The mine has still 2000 feet of unexplored ground. It took the old company 30 years to work out 1800 feet to a depth of 800 feet. This reserve would exceed an original location of 1500 by 500 feet. The writer does not profess to be able to see any farther into the ground than the average miner, but no one will dispute the fact, that independent of the ore left in the old part of the mine, this 2000 feet of unexplored ground bids fair to hold within its limits ore equal in quantity and value with the old Souleby workings. The mine is equipped with a most complete plant in the way of hoist, pumps, and complete water-power mill of 15 stamps. Mr. W. Sharwood is in charge, than whom there is no better mining superintendent on the coast. The property is now on the London market, but why it should go there is an enigma, as but a small expenditure would open the mine to a depth of 800 feet from the old shaft.

Black Oak.

This mine is now in charge of Mr. W. P. Scott. The mill is idle while the mine is being developed and prospected. At the time of my visit a body of high-grade ore had been encountered that gave evidence of future dividends. The mill is equipped for either steam or water power, and the high grade of the mine's ores should keep it a steady dividend-paying proposition.

Platt & Gilson.

Mr. A. Trittenbach is again in charge of the mine. This work has shown up a fine body of ore. The shaft is now down 300 feet, with drifts run 600 feet. The ore body just cut is on the 300-foot level. The vein is here 16 inches wide of quartz, carrying one per cent of sulphurets, \$75 to \$80 a ton in value, in addition to the \$8 a ton in free gold. The mill is of ten stamps, complete in every department.

Eureka Con. or Old Dead Horse.

The parties in charge have but little to say and I shall not try to excel them. C. H. Thomas is in charge. The ore is from the 700 and 900 foot levels. The quartz carries 1½ per cent of sulphurets that run from \$30 to \$70 a ton, and an average of \$250 a ton in free gold. The 20 stamps are all running.

The Buchanan.

Mr. E. C. Davis, president, is running along on the even tenor of its way. A new shaft has been put down north of the old workings, and a complete hoist is now being placed in position. The vein is eight feet in width, carrying a good per cent of \$100-sulphurets, besides a profitable amount of free gold. Perhaps you know Mr. Davis?

Jamestown.

The Gem mine, W. N. Harris is owner and superintendent. Mr. Harris has recently

opened up an old vein, which is now 30 feet wide, and neither wall is reached. The vein matter is talc slate; from this Mr. Harris saves \$3 a ton, and when he has his mill properly equipped, he expects to double the amount. The ore body is so large that there is little danger of its giving out, and as the ore is simply quarried out, the work is very profitable.

Quartz Mountain.

Mr. E. D. Bowman is still in charge of the Heslep as superintendent, though he purposes soon to forsake his old love for one of fresher charms in Plumas county. The ore at the present time is coming from a small, flat vein near the summit of the hill, and is said to go \$50 a ton, and from an open cut near the mill. The ore body in the open cut is large but low in grade. Fifteen stamps are running. If the mine was equipped with a 60 stamp modern mill there is but little doubt that the entire Quartz mountain could be worked to a fair profit.

The App.

This mine parallels the Heslep. At present it is being worked under lease, and \$35 ore is extracted and milled in the 5-stamp App mill.

The Dutch Mine.

The Fitzgerald Bros. own and operate this claim. At the time of my visit the boys were sinking a shaft on a vein parallel to the one on which all the work heretofore has been done. The vein was about three feet wide, and the ore of that kind that miners are sometimes charged with filling their dinner-buckets with for ballast—i. e., mortar rock.

Jacksonville

The Willimetta and Tuolumne are being placed on the London market. The mines have a ten-stamp mill. In the past history of the property the management was reckless, if not worse. Granite that did not contain a color in a mountain of it was milled, while the vein proper was not even explored. The mines are on the mother lode, and only need the competent management that they will now receive under the present superintendent, Mr. W. Sharwood, to make them profitable. The Clio, which adjoins the Tuolumne, is said to have got into very high-grade ore, and is now being placed in the Eastern markets. There is a large unexplored field in this section that bids fair at no distant day to attract capital, and eventually prove a valuable acquisition to the mines of old Tuolumne. The county is just on the eve of a period of prosperity in all her mining camps, and the coming year is destined to be the best year in her quartz-mining history. To the mining superintendents and others, who extended every courtesy to your representative while among them, the writer would extend sincere thanks. As for the others—there is no sweet without its bitter; we need the one to bring out and appreciate the contrasts in the other.

E. H. SCHAEFFLE.

The Mines of Calaveras County.

[From Our Traveling Correspondent.]

EDITORS PRESS:—In previous letters I have given you an account of the present condition of the mining industry at Angels and Copperopolis; in this I will endeavor to give a short statement of the leading mines, or those in active operation, in other parts of the county.

Sheep Ranch.

The Sheep Ranch mine, J. B. Haggin, owner, W. H. Clary, superintendent, is dropping 20 stamps on ore from the 900 and 1100 foot levels. The chute is about 600 feet long, and the mine is said to net its owner \$80,000 a year. Outside of this mine there is nothing doing in this section at this time.

El Dorado.

Mr. G. Rodasani holds a number of mines in this and Sheep Ranch district that have been developed several hundred feet and have given very satisfactory mill returns from large lots of ore crushed. The mines are worthy of an examination.

Railroad Flat.

The Lava Bed mine, C. H. Evans and D. Lamson, owners, is located at the head of Nelson's Gulch, two miles south of Railroad Flat, on the El Dorado wagon-road. The property is 1½ miles long, on an east and west branch of the blue gravel lead. The channel is about 40 feet wide, with five feet of blue cement gravel that averages \$250 a ton in bright, coarse gold. Their working shaft bottoms the channel at 100 feet and is in lava ash. This is the first shaft to bottom the channel and prove the value and character of the cement, which is identical with that of the May Flower at Forest Hill. The proof that this channel crosses Calaveras adds a large area to the drift mines of the State. Thus far all the locating and prospecting has been done on this fork; the main channel crosses northwest and southeast, and is not opened that I know of except on the ranch of Bill Porteus near Woodcock's sawmill, West Point. From this point it runs southeast to O'Neill's creek, just northwest of Sheep Ranch. The entire channel is covered with pink lava ash, and on the main channel—which is all open to location—tunnel sites can be secured throughout the entire length of the deposit. Just what the width of the channel is would be difficult to determine, but the lava cap is from nothing to a mile in width. This is a most inviting unoccupied field for very

profitable mining and should attract the attention it merits, as the character of the pay and the extent of the deposit make it an immense mining proposition far exceeding in value all the known quartz ledges in the county.

On the Bald Eagle, Mr. J. E. Enright is putting up a ten-stamp mill to test the ores.

At West Point, the Lone Star, Riverside and Lookwood are closed, as is the Tom Paine. Mr. Brown is below organizing a company to take the Wide West. A number of prospects show good bodies of high-grade ore.

The Smith Mine.

Mr. E. S. Tibbey, as superintendent and owner, is putting up a plant on this mine and crowding things in his usual energetic manner. The mine parallels the Blazing Star. In fact, the vein is almost on the side line. Mr. Tibbey is now sinking on the vein, is down 100 feet, and has a 2½-inch vein of heavily sulphureted rock that carries in addition a large amount of free gold. The average milling rock goes \$50 to the ton, while the smelting or shipping rock averages \$189. The improvement in the adjoining mine, the Blazing Star, as depth is attained, has made Mr. Tibbey determined to stay by it until he reaches an equal or greater depth, when he is sanguine that he will have an equally large and high-grade body of ore.

The Blazing Star.

This is now an incorporated company, with Mr. J. F. Crosett, formerly of the Lookwood and once a type on the MINING AND SCIENTIFIC PRESS, as general manager, and Mr. C. J. Moore, who has stood by the mine through good and bad luck, as superintendent. The shaft is now down 260 feet, and will be continued 100 feet more and levels run before ore is extracted. The lower level, in the present workings, shows a shoot 200 feet long (with chances of it continuing for 50 feet more) of a vein which averages seven feet in width of ore. The milling rock averages \$50 a ton and the shipping or smelting ore \$125 (as can be proven by reference to Selby & Co.). The manager confidently asserts that now the Blazing Star is "the biggest mine in the county." The owners, as well as all West Point, are to be congratulated on the improvement in depth of this mine, and it will no doubt encourage others to further develop their mines. A 200 foot shoot on a seven-foot vein of \$50 to \$125 ore is a big thing for even West Point.

Rich Gulch.

The Ilex is idle. It stands as a monument to "top-heavy" mining. The company own a vein parallel to the one on which a fortune was wasted. This parallel vein has had no work done on it, though all the miners who are familiar with the property assert that the "petered" vein was but pocket rock, while this undercropped vein is milling rock of paying quality. As the company has 40 stamps hanging idle, it could soon, with the balance of capital remaining on hand, prove the value of this vein, and in all probability bring success out of a big disastrous failure.

Mokelumne Hill.

Mr. T. A. Goodwin, who can discount Bill Nye and beat him, is in charge as superintendent of the Quaker City mine. The mine is 1½ miles southeast of the old Gwin mine and is on the mother lode. The old shaft was put down 400 feet on a four-foot vein of \$7 rock. At present the mine is in course of development, with a Huntington mill in prospect.

The Starlight Con. M. Co.

Mr. Geo. R. Tuttle, the principal owner, is in charge as superintendent and manager. The mine is situated on the west side of Chili Gulch, three miles east of Mokelumne Hill, and contains 180 acres. It is a drift mine located on the old Chili Gulch channels and supposed to cover the junction of the Chili Gulch and Stockton Hill channels. The channel runs N. W. and S. E. and parallels the mother lode, which is but a half-mile distant. The shaft is down 195 feet to bedrock, with drift run 40 feet west, and it is estimated that it will have to go 200 feet to reach the rim. The east drift is now connected with the old workings and shows the width east from the shaft to be 215 feet. Should the gravel hold 200 feet west, this will give 400 feet in width of cement gravel that pays \$2 to \$3 a ton for from 8 to 12 feet above bedrock. The bedrock is a blue-black slate, while the cement is of the same color filled with a quartz boulder wash.

Mr. Tuttle intends running up the center of the channel 1200 feet to the end of the property, driving cross-drifts, and when the end is reached, drifting out and back-filling with the waste hewlers. A three-stamp double-discharge mill is in course of erection. This is intended to handle the cement extracted and thus prospect the cement. Once the mine is developed, it will be equipped with a mill equal to the mine's output. The millsite has an excellent dump and 275 feet fall from the ditch for water-power. The cement body is almost inexhaustible, the situation all that could be desired, and the extent of the dividends only limited to the difference between the working expenses and the proven value of this immense reserve of cement.

The old channels that cross the county in every direction, capped with basaltic lava and lava ash, are destined to prove equal in extent and value with the old gulch diggings of the days of '49, and Calaveras, in consequence, take the same position she once enjoyed as a producer of the noble metal.

E. H. SCHAEFFLE.

The Tuna.
[Written for the Press by G. R. ORCUTT.]

Probably no class of plants is more greatly admired or more thoroughly detested than the *Cactaceae*—admired for their oddity, for their beauty of form, for their lovely flowers and for their luscious fruit, the cacti are detested to almost an equal extent by the average cattleman, who regards them as a useless lumberer of the ground.

The flattened oval or elliptical stems of the *tuna*, abundantly armed with a formidable array of spines, is the type of one of the most millar forms of cactus, and perhaps better known to English-speaking races as Indian figs or prickly pears.

Among the numerous known forms of *Opuntia* there are several species which are very generally known to the Mexicans by the name of *tuna*. *O. tuna* and *O. ficus-indica* are the two species which this name is more frequently applied, at the common wild varieties or species of stemmed *Opuntia* are very generally included without distinction.

These cacti are very widely utilized in Mexico and in portions of the United States along the Mexican border in a countless number of ways. The cattleman, after horning the spines from the tender, succulent joints, will feed them to his stock with profitable results; or, in treeless region, he will plant them as hedges round his corral or cultivated fields, thus utilizing what in the previous case he destroys—the plant's natural defense against total extermination.

Growing in dry, sandy or rocky soil, they thrive where scarce any other vegetation can exist. Planted around the Californian Mission, the most fertile spots, they attain a most luxuriant growth. There, they are naturally adapted not only to thrive in sterile districts and to prepare the barren soil for other classes of vegetation, but they are equally at home under the most advanced stages of cultivation. The *Cactaceae* are without exception, I believe,

tuna. This famous species, so well known as a hedge plant in Mexico and the West Indies, abounds on every high, sandy beach from Tampa Bay around to Miami, and, perhaps, still farther north on the east coast. It quite often grows in impenetrable masses, four or five feet high, and is characterized by large oval joints, six or eight inches long. It is covered with two sets of spines, some small and chaff-like, but whose close acquaintance is not to be courted, and others an inch or more long, as sharp and strong as needles, and quite as formidable as any cactus we have seen. The yellow flowers almost invariably have a rosy tinge, and the plant is beautiful, both when in bloom and when covered with the large, rich, purple berries or prickly pears.

"Beside its use in tropical America as a hedge plant, it is used as one of the principal cochineal plants. It is quite hardy and will stand several degrees of frost unharmed. The fruit,

known as 'Indian figs' in the West Indies, and stray specimens occasionally find their way into the New York markets from some West Indian vessel."

In *Garden and Forest* I have called attention to a note to the possibility that the manufacture of syrup from the fruit of the *Opuntia* may at no far distant day become an important industry in Southern California. The juice of the fruit which these plants produce in great abundance, may be extracted in a cider press like the juice from apples, and boiled down to a fruity syrup indistinguishable in flavor from that manufactured from the watermelon. Excellent vinegar or wine may also be made from the juice. Three varieties or more are found naturalized around the California Missions, called the *tuna*, *tuna colorado* (red tuna), and *tuna manse* (tame tuna) respectively by the inhabitants of Mexico. They are extensively cultivated in Mexico for their fruits, and a great variety of forms occur in that, their native country. Dr. Edward Palmer, a noted horticultural explorer, has contributed an interesting article on *Opuntia* fruit as an article of food to the *West American Scientist* (VI 67), which has been widely quoted and is reprinted in the

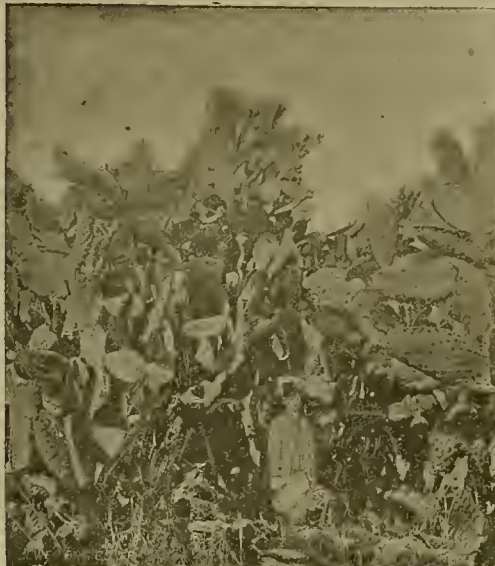
broad-spreading plant, with a cylindrical, woody, thick stem when old (up to 45 cm. long and 30 cm. broad in size), green, thick (2½ in.), thinner on the edge, elliptical, with small reddish leaves; areolae regularly distributed, sunken, thornless or rarely covered with a few single, small, bristly, white spines. Flowers large, brimstone yellow. Fruit very large and edible. Grown in large quantities in Sicily for its delicious fruit. Four varieties, with yellowish, blood-red, whitish and reddish fruit respectively, the two latter considered the best."

The *tuna colorado* naturalized at the old Mission of San Diego, which I take to be a type of *O. ficus indica*, produces a rather luscious fruit, not very sweet, mealy, closely resembling in taste and flavor a frozen apple. The color is a crimson lake inside and out, the epidermis slightly dotted by a glaucous bluish. Seeds numerous, over 200, easily separated from the pulp. The fruit is ovate, 3½ inches long, 2½ inches in diameter, smooth, with over 60 areolae of fine spines distributed over its surface, a fourth bordering the deep-brownish umbilical which is an inch across. Spines usually few, short and weak; whitish, often entirely absent.

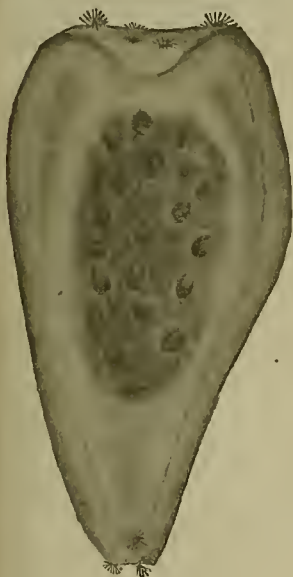
OPUNTIA TUNA—Linn.

"A native of Mexico and Columbia. Tall, broad-spreading plant, large, rather long (10 to 20 cm.) ovate or elliptical stems, the edges curving, with pointed green leaves seven mm. long. Covered with hooches of spines growing close together at base of stems, and wider apart at top, like gray felt in color, the upper spines brownish-yellow, underneath four to six stiff, hook-like, light yellow spines of unequal length (9 to 21 cm.) Petals the shape of rose leaves, mucronate; stamens yellow; stigma five-lobed; green."—Forester's Cactaceae.

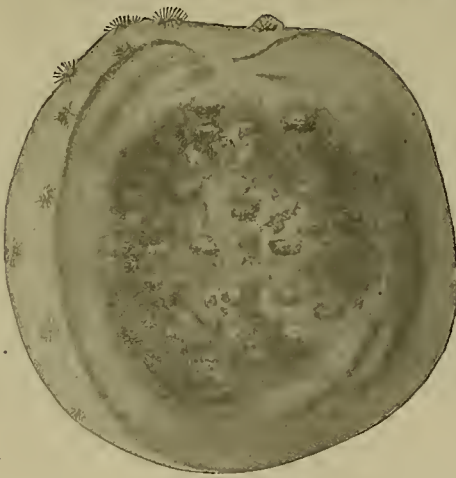
The *tuna* which I take to be this species bears a very juicy, sweet, delicious fruit, yellowish-green when mature, nearly three inches long and two inches in diameter, with fewer seeds (about 150). The greenish white, firm pulp is very cool and refreshing, from which the seeds do not readily separate as in the *tuna colorado*. The slightly glaucous epidermis of the fruit is similarly armed with an equal number of areolae of fine, short spines, very disagreeable, but easily disposed of by an expert—though dangerous to a novice if he should stand too windward while harvesting them off the fruit, when they are liable to blow into the eyes with disastrous results. The average Mexican or In-



TUNA MANSE AS GROWING IN SAN DIEGO.



WILD TUNA.



TUNA MANSE.



TUNA COLORADO.

ever, indigenous to the American continent and the adjacent islands, but the *tunas* in numerous varieties have become extensively naturalized and are also cultivated with considerable profit in the south of Europe. In Sicily, *Opuntia vulgaris* is said to thrive in volcanic districts, which would otherwise be barren of vegetation.

The Mexican names *nopal* and *tuna* refer to the same species of plants, but *nopal* refers to the leaf-like stem, while *tuna* refers to the fruit. From being used to indicate a part only of the plant they had come to be generally applied to the whole.

The *tunas*, naturalized around the Missions of southern California, were brought from Mexico by the Spanish padres, who trained them into edgeward around the Mission gardens and buildings. They grow from 10 to 15 feet high, producing an abundance of a large, well-flavored, edible fruit.

P. W. Reasoner, in the *American Gardenist* (532), in writing of "native Florida cactaceae," gives the following interesting account of the occurrence of two species of *tunas* in that State:

"Next, and of more importance, is *Opuntia*

covered with occasional tufts of small chaff-like prickles, are two or three inches long, somewhat pear-shaped and pumpkin-colored. They are produced in the greatest profusion. We know of an array of glasses of marmalade, and jars of the richest wine-colored sweet-pickles, made from the fruit, and as tempting as an epicure could wish.

"Equally famous is *O. ficus-indica*, the 'Indian fig' cactus. This species has escaped from cultivation and has become naturalized in a few places in south Florida, especially on Key West. It, also, is very hardy, and would doubtless prove so in north Florida. It is a most striking and picturesque plant, attaining, in a few years from the cutting, a height of 10 or 12 feet, with immense flat joints a foot or even 14 inches in length. The scale-like spines often drop off and leave the surface perfectly smooth, so it is not very prickly nor difficult to handle. The fruits are larger than those of *Opuntia tuna*, and are yellow in color. The pulp is sweet and has very few seeds. It is very much liked by most people who are familiar with it, and we have seen those who preferred it to such popular and delicious fruits as the orange and banana. The fruit is

annual report of the California State Board of Horticulture for 1890, page 133, and elsewhere. In the same report is given a plate illustrating the fruit of the *tuna colorado* and the *tuna manse*, and also of the wild tuna (*Opuntia engelmannii*). See engravings used herewith.

Gerald Haetinge (*American Garden*, XI, 475) says: "Several species of *Opuntia*, particularly *O. tuna*, yield the red, green or yellow fruits known as prickly pears. These are sweet and juicy and extensively used as dessert by the Mexicans and inhabitants of Southern Europe. Their juice is used as a water-color at Naples, and for coloring confectionery in the West Indies."

OPUNTIA FICUS INDICA—Haworth.

"During the eighteenth century Mr. Philip Miller of Chelsea Gardens, England, brought several cacti into notice, at least eight being credited to him and described in his *Gardener's Dictionary* in addition to those already known. Martyn's edition of Miller's *Gardener's Dictionary* enumerates, among others, *Cactus ficus indica* and *O. tuna*. Not having access to the above works, I am unable to learn with any degree of certainty as to the characteristics of the types of these species. Apparently the most reliable description accessible to me is in Forester's 'Cactaceae,' of which the following is a free translation:

"Native of South America, cultivated south of the Rio Grande under the name *Nopal castillano*; naturalized in Italy and Sicily; tall,

dian learns to handle these fruits with utter indifference to the spines.

The spines are abundant and rather formidable in appearance on this beautiful plant, but are really one of the most useful characteristics of the plant, making it very useful for hedges and fences.

OPUNTIA "TUNA-MANSE."

The color of the fruit of this *tuna* outside is of a deep ochraceous-buff, slightly glaucous, irregularly mottled and blotched with crimson, giving it a bloodshot appearance; inside the outer coating is of the same coloring, but the pulp inclosing the seeds is of a light greenish-yellow.

This is the most abundant of the three forms of *tunas* naturalized at the San Diego Mission, and like the others is credited with a Mexican nativity. The fruit is nearly globose, with a yellowish umbilical, pitted in the center, an inch in diameter and smaller proportionally than in *tuna* or *tuna colorado*. Seeds more numerous (about 250). Areolae and spines on fruit and stem differ but slightly if any from *O. tuna*, from which the plants may not be readily distinguished except when in fruit.

[The manner of growth of this species is shown in the engraving, showing a column with the figure of a man central, thus indicating the size the plant attains. The cuts of the three species of fruit are from B. M. Lelong's report for 1890, as noted above.—EDS. PRESS.]

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

HARDENBURG.—*Ledger*, Feb. 28: Grading for a millsite was commenced at this mine at Middle Bar on Monday. We understand it is intended to put up a 15-stamp mill, and the stamps of the old mill now on the claim will be utilized in the new structure. The stamps are light, 600 or 650 pounds, but it is the opinion of many expert millmen that better results are obtained from light than from heavy stamps, the tendency of the latter being to create such strong commotion as to cause a greater loss of gold. The mill is to be put up near the shaft, and is well located for water-power, the pressure being ample. James White, who superintended the construction of the Amador mill, has charge of putting up this mill.

GOVER.—At the Gover they have succeeded in getting their 700-foot level cleared of water the first time since it was flooded six years ago. At that time they put in a large bulkhead in their north drift where their water came in, and for two weeks it held the water back; then it made its appearance 40 feet this side at the rate of 75,000 gallons per 24 hours. This flooded their lower levels again and during these last six years they have never been able to get this level cleared again. For the last two months they have been pumping and skipping water, and last Friday, the 20th, they cleared the level and found that the place where water broke in, 40 feet this side of the dam, had choked up by drawing the water down and didn't leak a drop. At present time water has been confined nearly a week, and instead of breaking into the mine again has made its appearance half a mile north in an old tunnel which, when the mine was flooded, was dry. This is a most important fact to the Gover people, as they can now easily control the surface water, and they will immediately open out their lower levels where the original Gover Co. abandoned rich ore when the mine was flooded. It is also reported that they have struck another pay chute on their 500-foot level.

BELMONT MINE.—At this mine the surface tunnel has been driven 20 feet the last week; total distance, 120 feet; 50 feet have yet to be driven before ore is reached and the company's 10-stamp mill can be started.

MISCELLANEOUS.—No further developments have been made in the Bell Wether or Bright mine. Little has been done this week, owing to the fact that machinery is necessary to the further prosecution of work. A horse-power whim has been purchased from the Live Oak mine on Stony creek and has been moved to this claim and will be erected forthwith. A. O. Wilcox, who has been running a roller mill at the Beardslee cement gravel claim, Upper Rancheria, for several weeks, got down to his old stamping-grounds in Jackson last Saturday. He reports that the auriferous cement carries about \$3 worth of gold to the ton, at which rate it ought to yield a fair profit. E. E. Dye, in charge of the Amador gold mine, went to San Francisco last week to arrange for the payment of taxes upon the property, and other business. He returned Tuesday night to find that the property had been sold that day for delinquent taxes to G. Quirolo. The buyer is entitled to 50 per cent advance on the purchase price, so that the taxes and costs now run up to over \$100. The property was among the first on the list, and as the tax-collector must offer each parcel in rotation, it was one of the first offered and the bid was jumped at as a solid investment. The property will of course be redeemed before long.

Del Norte.

THE BEACH MINES.—*Del Norte Record*, Feb. 21: Last Sunday our representative, accompanied by that veteran Black Sand miner, Col. Yates, made a trip down the beach to where the black sand mines of Messrs. Raymond and Lhote are located, to view the manner in which the gold is obtained from the auriferous black sand by the machine used at this mine. Arriving at the mines, we find the engine and machine under a shed, while the men are kept busy wheeling harrows up a runway to a platform alongside the top of the machine where the sand is dumped and fed into the machine by the shovelful by the feeder. As this machine is built and operated on an entirely different process from that used by the beach mines in this neighborhood a number of years ago, we give the following description: The machine stands about seven feet high, with four arms running from the center of a shaft, about three feet from the ground; these arms are about four feet long and each supports a pan about 2½ feet in diameter; above this about two feet is a large pan built so as to cover the center of the lower pans. The sand was fed with a shovel into a hopper, into which a stream of water ran from an inch pipe. A screen immediately under the hopper screened out the gravel. This sand was washed through a discharge pipe into the circular pans below. These pans are double ones, consisting of an outer and inner pan. The inner pans are shallow, circular, and made of copper, the surface of which was silvered and coated with mercury; they are suspended within an outer and deeper copper pan, the surface of which is also silvered and amalgamated. The water and sand flow down upon the inner pans, to which, by the revolution a motion is given similar to that of a pan worked by hand. The gold is caught upon the surface of the inner pan, while the sand runs out into the tailing-box. The screen on this machine is the invention of C. W. Babcock of this city; and on account of the pebbles and gravel found in the sand, it would be impossible to run the machine were it not for this attachment. This machine has a capacity of about 80 tons a day; at present they are running with a force of six men.

Nevada.

THE MINES ARE ALL RIGHT.—*Grass Valley Union*, Feb. 26: The late storms of rain and snow have not materially interfered with mining operations in this district, but little if any extra water coming from the surface has given the mining pumps more than their usual work to perform. The water supply for power, has not been interfered with, as the source of supply, the South Yuba canal, has not been broken or snow-blockaded, as was the case at this time last year. At that time all the mines of the district were being flooded with

water, and it was a hard and long struggle to prevent them from being drowned out.

THE PEABODY.—*Grass Valley Union*, Feb. 26: A cleanup of 55 tons of ore from the Peabody mine was made at the Crown Point mill on Monday, which gave a result of \$25 per ton. This was entirely satisfactory as showing the quality of the ore produced by the mine. The Peabody Co. will soon commence making important improvements on the mine by sinking a new three-compartment shaft between 400 and 500 feet west of the present shaft, and the erection of new pumping and hoisting works, which will be operated by steam-power. This shaft will be constructed in the most substantial manner, with a view to the permanent development of the mine. The shaft will be sunk from the surface and an upraise also made to it from the No. 3 level below, which has been run far enough to the west so that a connection can be made with the new shaft. The operations which have been carried on for the past year have been mainly for prospecting purposes, and the mine has now been opened sufficiently and is showing so well that the sinking of a new shaft is warranted, as it is found that the old shaft is not located in the right place. During the progress of sinking the new shaft, the work of hoisting ore through the old shaft will go on as heretofore. With the new shaft and with new hoisting and pumping works the Peabody will be well equipped for further operations.

CALIFORNIA.—The California M. Co., recently incorporated to work the Pittsburg mine, on Deadman's Flat, has had its 20,000 shares set aside to raise a working capital promptly subscribed for, the whole amount having been taken. These shares were taken at Grass Valley, Marysville, San Francisco and San Jose. After they were taken, an order came from Chihuahua, Mexico, for 5000 shares, sent by Grass Valley men who are employed in the railroad shops at that place. The company is now placed in funds for its preliminary operations, and should it be found that more capital will be necessary, there are yet remaining 20,000 shares that can be used for raising additional capital, but this will not be disposed of at less than 50 cents a share. The mine has a good record as a prospecting operation, is well located in a portion of the district where the mines are doing well and are held in high favor, and there is every reason to believe that it will open up well as soon as the new works are put up and the shaft and drifts can be put in shape for systematic exploitation.

Napa.

A VALUABLE MINE.—*Calistogan*, Feb. 18: B. M. Newcomb, superintendent of the Napa Con. Quicksilver mine, has sent to us the following report of business done at the mine during the past year:

Cash disbursed.....	\$119,157
Total payroll.....	104,629
Paid for farm products.....	15,800
Wood and lumber account.....	21,748
For building roads.....	3,120

During the year 17,770 tons of ore were mined and treated, from which 2700 flasks of quicksilver were obtained, the weight of the metal being 206,550 pounds. Credited to the work of development are the following items: Tunnels and drifts, 8800 feet; shafts and winzes, 1000 feet. The N. C. is one of the most valuable quicksilver mines on the coast, and from present indications will annually furnish a large amount of metal several years to come. That the mine is located within the borders of Napa Co. is a fact we are pleased to mention in this connection.

GOOD PROSPECTS.—The work of prospecting on ground formerly included with property of the old Calistoga G. & S. M. Co., on the side of Mount St. Helena, has been going on the past few months, Dan Patton and others interested believing that plenty of good ore is there if it could be found. The indications now are very good that their efforts will be crowned with success. The prospect work is being done near the excavations made years ago in the old mine. In excavations recently made a vein about two feet wide has been encountered, and from it good milling ore has been taken, some of it being high-grade. Greater depth will be necessary to prove the value of the vein, but as the prospects are good the necessary work will be most cheerfully done. There is plenty of ore in the old mountain and we hope the company now looking for it will succeed.

Placers.

THE LAND OF GOLD.—*Herald*, Feb. 28: Last Monday morning after the unprecedented hard storm of the night before which washed the streets and gullies clear of soil, the gold-hunters were out in force. Quite a number of pieces were picked up in different parts of the city, varying in value from a few cents to a few dollars. The largest find reported was by Katie Deekin, who picked up a piece in the road out near Ames' place worth some \$6 or \$8. The value of all the pieces picked up here in the city would probably exceed \$20. California is truly the land of gold. In Auburn they literally pick it up in the streets.

Plumas.

GIBSONVILLE.—*Cor. Plumas National*, Feb. 28: No doubt the mining men will be glad to hear that bedrock was struck in the Thistle shaft, last Sunday. They have fine-looking gravel and it prospects well. The shaft will be completed in a few days, if nothing happens to prevent them working. They will then commence running tunnels off from the bottom of the shaft. The workmen, while repairing the North American mine, have found that the bad air which caused Mr. Mark Schofield's death was caused by a fire in the mine at the No. 3 turnout, where a great number of timbers were piled. It is generally supposed that the fire was set by some unknown party, although it might have been an accident or an explosion of gas.

Siskiyou.

HONOLULU.—*Siskiyou Telegram*, Feb. 28: Henry Mack of Honolulu was in the city for a short time last Wednesday, while en route for Fort Jones. He informs us that the majority of the mines on the Klamath will be worked this season. The Phil Mott claim, in which Mack is interested, will be operated on a larger scale than ever this season. The majority of the companies are at present in the woods cutting the necessary timber for constructing their windmills. We look for some good results from Klamath this year. We understand that the Centennial mine at Honolulu, on the Klamath river,

will be operated quite extensively during the coming spring and summer. It is the intention of the owners to open up farther up stream than ever before, and near the Bentz Bar mine, which is operated very successfully by a Chinese company. Gott & Co., the owners of the Centennial, have persistently worked it for years, with varied degrees of success, and expect to do much better on their present location.

AURIFEROUS GRAVEL.—*Yreka Journal*, Feb. 26: Frank H. Hall, consulting engineer, of San Francisco, is now cutting through the rimrock in the old August diggings at Quartz Valley, where he expects to tap an old dead river channel containing an immense body of auriferous gravel, believed to be exceedingly rich, and which extends from Callahans along the west side of Scott River to the canyon and thence to Scott Bar. Louis Guilbert of Yreka has been at work lately sinking a mining shaft in a claim located east of the Shasta Valley road, about three miles south of town in the Kildore hills, near the old Oak Grove race-track, and has found colors all the way down, with improving prospects at a depth of 30 feet. No signs of bedrock are yet visible, although bedrock crops up at the gulch near the wagon-road, where considerable gold was taken out in 1854. Louis thinks the indications are very favorable for tapping the famous blue gravel channel, which undoubtedly extends along the east side of Yreka to mouth of Greenhorn and out into Shasta valley. E. Dudley and others have also taken up claims in the Kildore hills, close by Guilbert's location, and will also commence prospecting by assisting Louis to get down to the bedrock, which will be the best means of ascertaining the certainty of the existence of a dead channel containing gold.

QUARTZ.—The quartz-mill on Yreka Flats will soon be moved farther northward on the flats in the vicinity of Long Gulch, where there are a number of rich and extensive ledges, which the owners intend opening on a large scale during the coming summer. The quartz-miners at head of Greenhorn creek and on Cherry creek, on the Greenhorn and Deadwood divide, are also anxious to have a custom-mill put up in that section, and guarantee to furnish a good supply of quartz for crushing, the hauling for long distances being quite expensive and slow, owing to the steep grades required in reaching the various mountain ledges.

RIVER MINING.—The river-miners on the Klamath are still at work in taking out pay gravel, notwithstanding the storms of the past week, which have not raised the stream over a foot higher. They will probably be able to continue work right along, as it is too late in the season now for the possibility of any freshets likely to interfere with the windmills that have been in use all winter.

Sierra.

SIERRA CITY.—*Mountain Messenger*, Feb. 28: There are 15 then working at the Colombo; Cleveland, 20; Young America, 80; and Berger's ledge, 30. Only two men are employed by the Sierra Buttes Co. Jos. Carney is in charge of the flume and lakes, and Stephen Thomas, office, buildings, No. nine mill and mine. The upper 20-stamp mill will be rebuilt next April. Two men are getting out rock at the Wm. Tell ledge. The six-stamp mill is to be started as soon as sufficient water comes. Milling ore already crushed averaged \$20 a ton. Average yield, through the ledge, as far as developed, \$7 a ton. R. A. Grass, one of the stockholders, is superintendent.

Trinity.

RUNNING ON FULL TIME.—*Journal*, Feb. 21: Mr. W. J. Grigshy, who was in town the first of this week, informs us that the Buck's Ranch Mining Co. has extended its ditch to the main East Fork creek, a distance of about 2½ miles. This will give them a good supply of water for the entire year. They are now running their mill day and night and getting satisfactory results. The ledge can be worked very cheaply and very low-grade rock can be crushed with a profit. This company has the widest ledge on the creek, and with the facilities they now have for working it there is no doubt that a handsome profit will be realized.

NEW RIVER.—Capt. James Franzen arrived in Eureka from New River last week and informed the Standard that the superintending officers of the Ridgeway mine were anxious to have him remain a day or two longer, believing that daylight would be struck through the upraise in that promising mine within that time. All was anticipation in connection with that event, the general belief being that it was the forerunner of an important era in the history of the Ridgeway, from which golden returns are expected when the upraise work is completed. Capt. Franzen says that although times were comparatively dull, work was being prosecuted in some dozen mines in the district.

GRAVEL MINES.—*Redding Free Press*, Feb. 28: Billy Fowler the mining man has just returned from Trinity county, where he has been visiting the gravel mine of the Trinity Gravel Co. on the Trinity river. They have four giants running and expect to make a good cleanup at the close of the season. Mr. Fowler thinks that the recent law making the Klamath river not navigable will stimulate hydraulic mining in Trinity county and enable impecunious mine-owners to sell good properties to capitalists who heretofore have held aloof for fear of injunctions. Speaking of the Jillson gravel claim near Hornbrook, Mr. Fowler informs us that during a run of five days \$550 was taken out of the boxes, including one solid chunk of gold valued at \$130. Mr. Fowler insists upon it that this same blue gravel lead runs through a portion of this county, and that in the near future there will be some astonishing developments.

Ventura.

GYPSUM.—*Ventura Free Press*, Feb. 20: Superintendent E. Twining, who was in Ventura yesterday, said that the Ventura Plaster Co. had no intention of shutting down their mine on the Ojai, but on the contrary would increase the force as soon as they could work conveniently. The mine is being worked from a shaft with drifts leading away from it at a certain level. Several weeks ago it was found that more gypsum could be secured by going deeper, so those men working in the drifts were laid off. The remaining men were put to work sinking the shaft and in a short time a larger force will be put at work. The factory at San Francisco wants 50 tons a day, but thus far the Ojai mine has been unable to supply more than a quarter that amount. It is for the purpose of securing a greater supply that a mine is being opened in Orange county.

WILL REFINER ASPHALTUM.—The Ventura As-

phalt Co. is building refinery works on a vacant lot near the depot, and early next week will be ready to use a large quantity of rock. Thos. Moran of den, Utah, is here superintending the works.

NEVADA.

Washoe District.

BELCHER.—*Virginia Enterprise*, Feb. 28: resumed work in the north drift from No. 3 crosscut, 200 level, which is out a total distance 131 feet. The face is composed of clay. No. 2 west crosscut, 300 level, advanced 23 feet; length, 100 feet. The face is in porphyry. 1400 level east crosscut is out 73 feet. It reached what looks like the hanging wall. The width of about 20 inches of quartz next to wall, which contains bunches of good ore.

UTAH.—On the 725 level the northwest drift making the usual progress in ground of a favorable appearance. West crosscut No. 2 is in vein material that shows a good deal of quartz.

WARD COMBINATION.—The east drift on 1800 level is in a clay and porphyry formation.

CHALLENGE AND CONFIDENCE.—The north east crosscut, 300 level, is in 6 feet, having commenced during the week; the face shows quartz having no value.

ANDES.—During the past week north winze 350 level was sunk 11 feet. No change in location. North drift on 420 level was extended 16 in a formation of quartz, clay and porphyry.

GOULD & CURRY.—200 level: From bottom of winze No. 1 started a south drift on a small strip of quartz showing some ore; extended same to 140 feet. We have extracted from winze during the week cars of ore of a fair quality. 250 level: South from upraise has been advanced 10 feet; total length, 41 feet. Face in quartz and porphyry. West cut No. 1 from upraise has been advanced 11 total length, 97 feet. Face in soft porphyry showing bunches of quartz. 300 level: Carried up incline upraise No. 2, 12 feet and made connection with crosscut No. 3 on 200 level, thereby improving the ventilation of this section of the mine.

BEST & BELCHER.—800 level: West crosscut No. 2 has been extended 18 feet, through porphyry and quartz; total length, 504 feet. 1200 level: West crosscut No. 1 has been advanced 18 feet; total length, 140 feet. Face in porphyry, clay quartz.

POTOSI.—On the 930 level the east crosscut of the winze is still in porphyry that contains streaks of quartz. On the 1230 level the east crosscut, feet south of the Chollar incline, is in porphyry showing bunches of quartz. On the 1300 level, south lateral drift is showing clay in the porphyry. All is now in shape for a thorough exploration this level.

HALE & NORCROSS.—The usual prospecting operations are in progress on the 800, 900, 1100 and 1400 levels. At some points material of a promising appearance has been encountered. The repair of the main incline below the 1400 station are making good progress; also work on ore and waste chutes.

OPHIR.—The west crosscut on the 1300 level still in a material that carries some metal.

UNION CON.—East crosscut No. 2 on the 1 level continues in a clay and porphyry formation.

MEXICAN.—On the 1455 level No. 1 crosscut is advancing in a porphyry formation.

CON. CAL. & VA.—Are extracting ore from 1200, 1300, 1500, 1600 and 1650 levels. Good headway is being made in the south drift on 1100 level from the Con. Virginia shaft. It is in porphyry, and has yet a considerable distance to go before reaching a point where ore is expected. The usual amount of ore has been extracted sent to the mills, and the average assay value will about the same as last week.

JUSTICE.—The north drift on the 822 level is 356 feet. The face is in hard rock. Have done work on the 490 south drift during the week. S. ped to the mill 202 tons and 315 pounds of Average battery assay, \$75.66 per ton. Have speeded the extraction of ore, pending the connection of the 822 drift with the bottom of the 622 winze.

SAVAGE.—During the week we have hoisted carloads of ore from the 400, 500, 750 and 1100 levels, and from the intermediate level below 1300 level. Shipped to the Mexican mill 540 tons and milled 540 tons of ore, the average battery assay of which was \$15.60 a ton. We have hauled on hand amounting to \$18,670.20. We have resumed work in the bottom of the winze below 1300 level, and have sunk the same 20 feet, making its total depth 103 feet below sill floor 1300 level. From the Hale & Norcross north drift, 900 level which is 90 feet in Savage ground, we have commenced stoping ore in east crosscut No. 1. The body shows a width of 18 feet of fair-grade, mixed with some porphyry. We are extending the Hale & Norcross drift, 800 level, from south boundary into the Savage ground. This is now advanced 30 feet, and is encountering fair-grade ore on the east side of the drift.

SILVER HILL.—Good headway is making in opening out on the 500 level.

CON. IMPERIAL.—Work is still being confined following up and taking out small streams of ore on the upper levels and overhauling the old stope of mine.

ALPHA & EXCHEQUER.—The only work done was in repairs to the main shaft.

SEG. BELCHER.—The east crosscut from south lateral drift on the 600 level was advanced feet since last report, making its total length 69 feet. The face is composed principally of clay.

OCCIDENTAL.—Ore of good quality is being found in both south drifts of the 400 level.

SIERRA NEVADA.—630 level: The north drift is still in a porphyry formation.

OVERMAN.—Extracted 386 tons and 800 pounds of ore. Car sample assays average \$75.70 per ton. Shipped to the Brannish mill 46 tons and pounds of ore. Battery samples average \$76.60 per ton. On the 1100-foot level the incline up from the northwest drift has been extended 9 feet total length, 173 feet. At a point 165 feet up commenced to cut a station, and when complete will start a drift to the northward to connect with the southwest drift from the shaft. Incline up from the south drift has been extended 17 through quartz of a fair grade; total length, 100 feet. On the 1200 level southeast drift, on eighth floor of stope, has been extended 26 feet through quartz; total length, 94 feet.

KENTUCK.—During the week we have put

in the raise, 1000-foot level east ledge, and
and the raise 5 feet, making its total height 33
The top is all low-grade quartz. Continued
north drift on this level to the north line of the
and started an east crosscut from the end of it
high quartz containing some spots of ore which
aved for pay. The north drift from the west
advanced 10 feet, making its total length 19
The face is in low-grade quartz.

COLLAR.—Winze 80 feet south of north line,
level, is still going down in a mixture of quartz,
and porphyry. Good progress is making in
work of opening the station on the incline at the
level. The ore sent to the mill will average
on ton.

CROWN POINT.—The west crosscut on the 500-
level has been advanced 25 feet since last re-
port, length, 92 feet. The face is composed
of porphyry, with small seams of quartz through
are still engaged on repairs on the 600 level.

Tuscarora District.

YADA QUEEN.—*Times-Review*, Feb. 27:
on drift, 650-foot level, advanced 32 feet, show-
ing slight improvement.

VAJO.—East crosscut from north end of the
lateral, 350-foot level, is in 20 feet. Have
an intermediate drift from No. 5 chute,
level.

COMMONWEALTH.—Fourth level: East crosscut
now extended 36 feet, cutting seams of spar
and some water. West crosscut advanced 40
feet hanging-wall, will now start to open up
by this crosscut.

LE ISLE.—South drift, 450-foot level, ex-
tended 25 feet; the face is looking more favorable.
Main crosscut, same level, has been extended
40 feet; a little water is beginning to show in the
drift. The stope above the 350 continue in
grade ore. Broke 8 cars of high grade and 23
of concentrating ore.

ORTH BELLE ISLE.—North drift from Belle
450-foot level, extended 14 feet, no particular
change. The 500 stope continue to look well.
Broke 7 1/2 cars of first class and 37 cars of concen-
trating ore. No. 4 upraise from the 600-foot level
has been extended 16 feet; the top is all in quartz,
giving some good ore.

ORTH COMMONWEALTH.—Hoisted during the
21 tons of ore, average \$265 per ton, and 68
tons assaying \$20 per ton.

Oscoda District.

ORE.—*Salt Lake Tribune*, Feb. 28: The
mine some time ago noted the arrival of gold ore
from Oscoda, Nev., from some mines which Messrs.
Ham & Raddatz had purchased from Duff
Bros. Assays were made from four samples of
ore and they ran respectively in gold \$30, \$24,
\$18 and \$8, which is certainly excellent for free-
zing gold ore when it is in such immense quanti-
ties it is said to be in the Oscoda ledges. The
managers of this group have been negotiating with
Boston parties, who have agreed to purchase
the property if it is as good as the assays have shown,
or for the purpose of demonstrating this, 150 lbs of
ore was sent yesterday by express to the Boston par-

Pahranaagat Lake District.

TURNED.—*Pioche Record*, Feb. 26: Messrs.
Silvia and Geo. S. Barber, who two months
ago took a bond on the Balback mine, Pahranaagat
district, and went down to work on the claim,
have thrown up the work. The lessees say the
mine is a good prospect but not rich enough to
justify work in the face of such unreasonable diffi-
culties as they encountered, so they threw up the
mine and returned last week to town with their
tools.

ARIZONA.

OTES.—*Prescott Courier*, Feb. 26: D. Boaz
has been "looking the gold field over" in Big Bug,
and says the district has a fine metallic future. He
loves with the Boggs, Silver Bell, Gladstone and
other mines. Chloride Jack's bonanza is in
good health. W. H. Harlan, discoverer of the
Howard vein, is still in the shaft, taking out
and paying ore. Slate Creek miners have shed
their tools and will soon make large shipments of high-
grade ore. Jack McDonald, John Sugden, Nels
Gie, all of them have put on extra men. Crowned
King is shipping much ore and sulphur to the
Elaso smelter. Tiger mine is yielding high-grade
ore. Turkey creek miners are prepared to ship
fine ore. J. J. Williams reports fair progress
in several camps. Jennings, of Hassayampa,
wishes he had a mill to pound gold out of his
mine. Mr. Potter, a Michigan capitalist, is negotiat-
ing for certain mining property near Walnut Grove.
Lix creek hydraulic works are in full blast. Weav-
ers are making fair wages. Machinery for a
stamp mill was at Aztec, a few days ago, en
route to Harqua-Hala.

OHAVE NOTES.—*Miner*, Feb. 28: Jas. Mc-
Gor has made another strike on his claim at El
Dado canyon. Joe Labaree and James Cadden
are extracting good, rich ore from the Diana mine
in chloride. A. James will put a force of men at
work on the Bull Dog mine in Todd Basin stoping
ore. The pumps in the Cupel mine are slowly
raising the water and sinking will be commenced
in a few days. It is rumored that several Mohave
county mines will be incorporated in Los Angeles
at the stock placed upon the market in a few
days. Butolph and Grant have taken charge of
the Mexican mine in Todd Basin, and will place a
force of men thereon taking out the rich gold ore on
the surface. Geo. M. Bowers will have several tons
of ore from the Nighthawk dumps concentrated at
the James mill in Todd Basin. Supt. Butolph of
the Denver M. & Co. has a carload of ore ready
to be dumped of the Homestake mine in Mineral
Pk. From Wm. Heimrod, who is now in charge
of the mill at El Dorado canyon, we learn that a
strike of ore rich in both gold and silver has
been made in the Charleston mountains, on Indian
creek, about 100 miles northwest of the canyon in
the vicinity of Death Valley. The contract on the
Gen Bee mine is almost completed, and as soon
as the hoist can be put in place 30 or 40 men will
be set to work in the stope. James Carter, from
Ced Basin, informs us that the mill, under the able
management of Lew Lassel, has been running suc-
cessfully. Fred Brown is stoping a great deal of rich
silver-lead ore from the Indian Boy. In the Altatta,
Coride, Koster and McKinnon they have at last
rebed the ore body in the drift they have been

driving and they are rewarded by exposing two feet
of richer ore than was ever before produced from
that mine. The ore is silver, showing a great deal
of native copper. At the Empire, E. F. Thompson
has between 40 and 50 tons of very rich ore on the
dump awaiting shipment.

DOS CABEZAS.—*Cor. Tombstone Epitaph*, Feb.
25: We have up to this time had a singularly open
winter here. Even on the mountains 7000 to 8000
feet above the sea level our deepest snow has been
six inches, and, except in small patches on northerly
slopes, that is all gone. The quartz-mill at this
place has had a profitable run recently on 70 tons of
gold ore from the Ewell Springs lode. The yield was
somewhere about \$15 or \$16 per ton. This ore was
mined by Fowler & McGregor and was carefully as-
sorted. For each ton of selected ore about three
tons of barren and lower grade rock, say \$6 to \$8 in
value, were thrown aside, and it was only by con-
stantly making horn-spoon tests the grade desired
was secured. The mill has been running during the
last 10 days on paying ore from the Mescal
lode and from the old Rouse claim on the
Fort Bowie road, which seems to be a prom-
ising small vein. I regret to learn that Fowler &
McGregor talk of bidding our camp good-by.
The moving of their mill from the northern side of
the mountains to where it is now cost a round sum,
and the ores from the Philadelphia lode did not
yield up to expectations, so that they were consid-
erably out of pocket. Their claims in Park canyon
are so broken and faulted that deep tunneling alone
will make them productive, and for the present
means are not available for that work. The Casey
Bros. are getting good ore from the Juniper mine.
With their arastra at work during the summer
months they make a satisfactory living. Work has
been resumed in the Silver Cave 300-foot
tunnel, Geo. Phillips being, as in the past, S. R.
DeLong's stand-by in driving ahead. The rock in
the face is said to be very hard.

OVER THE MOUNTAINS.—At the Tevis camp all
is quiet. No work is being done on the mines or
in the mill except in making some changes in the bel-
ting. I am unable to give any reason for the cessa-
tion of work.

TO PUMP AT TOMBSTONE.—*Phoenix Gazette*,
Feb. 25: A large pumping corporation has entered
into arrangements with the Grand Central and Con-
tention mining companies of Tombstone to pump
the big mines on shares, and it is thought that active
operations will be resumed on those great bullion-
producers. It is unquestionable that these two prop-
erties, if the water could be handled, are two of the
richest mines on the continent, and the fact of satis-
factory arrangements being made will be hailed
with delight by the people of Tombstone and in fact
the whole Territory. The pumping company is to
put in large Cornish pumps and keep the water
down so that the mines can be worked, and will re-
ceive a royalty on all ores hoisted from the prop-
erties.

COLORADO.

THE CONOMARA.—*Aspen Times*, Feb. 24:
Not a little interest has been aroused in min-
ing circles by the fact that the Conomara is
shipping ore. This property is one of the fam-
ous ones of the camp, the shaft having been
driven down 1000 feet to catch the Aspen mine's ore
chute. The contact pitches very steep, but it was at
last intersected and some low-grade mineral was
found. At the 900-foot level some ore was developed,
and it is from this point that the present shipments
are being made.

PARK-REGENT.—The air drills are kept busy and
the levels are being driven forward rapidly. The
work shows ore at several points and the outlook is
very bright. Jack Lindsay now occupies the posi-
tion of superintendent.

THE LITTLE RULE.—The Little Rule is reported
to be looking far better than ever before. The ore
bodies are increasing in size as development work
progresses, and the grade of mineral also shows
improvement. The ore-bins are full, but the dan-
gerous condition of the trail interferes with the ship-
ping. A jack train was lost in a slide last week and
the greatest care will have to be exercised for some
days yet in taking pack animals to the mine.

THE NEWMAN TUNNEL.—The Newman tunnel
is now being pushed forward. The air drills were
started last week and are doing effective work.

TUNNEL VENTILATION.—The subject of tunnel
ventilation is one that has perplexed the engineers
considerably. The common plan has been to force
fresh air to the face and thus give good air to the
men at work. When air drills were introduced the
problem seemed to be solved, as the escaping air
furnished the supply that was needed. This plan
simply drove the gases back, and the trammers and
others who had to go in and out were seriously in-
convenienced. When Taylor & Brunton started the
Cowenboven tunnel they adopted a plan by which the
air, with all the foul gases, is sucked away from the
face. It is carried through a large pipe to the
mouth of the tunnel and a stream of fresh air is thus
kept moving in, the entire work being thoroughly
ventilated. The plan has worked so well that it has
attracted the attention of the contractors who are
boring the Busk-Ivanhoe tunnel on the Midland.
One of them came over last week with Chief Engi-
neer Bryant to inspect it, and determined to adopt
the system on the great railroad work.

LAKE CITY DISTRICT.—*Denver Republican*, Feb.
28: The Lake City district is slowly but surely
attaining prominence as one of the heaviest pro-
ducing districts of rich ore in the State. Constant
strikes are being made. Last week bodies of valu-
able mineral were encountered in the Cherokee, May-
flower and Pride of America, while suspended devel-
opment upon many good properties will recommence
in the spring. L. D. Hicks of St. Louis will begin
to open up the Crown Point in Sabaer basin at that
time. From the Palmetto mine large quantities of
ore are being extracted and stored for shipment.
The Broker is shipping two carloads weekly. At a
depth of 280 feet in the Cresco crosscut a heavy
body of ore has been encountered which will be pro-
spected 75 feet farther, with a view of ascertaining
whether this body is the main vein or a spar. An-
other property which promises to begin operations
in the spring is the Black Wonder M. Co. Litiga-
tion between the owners has for some time past fol-
lows suspended operations here. There is said to
be an abundance of good mineral in sight. Some
valuable development work is in progress on the
Sterling group in Cottonwood gulch. The Frank

Hough M. Co. intends to open up in the spring
with a large force. Another shaft will be sunk in
place of the old one which has become dangerous.
The Big Casino is another property that promises
to come to the front.

DAKOTA.

CALEDONIA.—*Deadwood Pioneer*, Feb. 29: At a
recent meeting of the board of directors of this com-
pany, the following officers were elected: W. F.
Goad, president; George K. Wells, vice-president;
J. B. Haggin, treasurer; Thomas J. Grier superin-
tendent. As already announced in these pages, the
mine was sold to the Homestake Mining Co., and
the new directory represents the purchasers.

D. & D. SMELTER.—Professor Franklin R. Car-
penter, general manager of the D. & D. smelter, re-
turned yesterday from a trip to Denver. The object
of his visit to Colorado was to examine the dry
smelting process of the Argo works. He has always
been in favor of the reverberatory furnaces, and his
recent visit to Argo has strengthened him in that
view. The reverberatory furnace is an English
method, while the blast furnace for smelting origi-
nated in Germany. In Montana the blast furnace is
used almost exclusively, although wherever the ideas
of English and American engineers are predominant,
the reverberatory furnace is used. In the new D. &
D. smelter the reverberatory furnace will be used.

CHLORINATION WORKS.—A gold brick, valued
at \$8700, was yesterday shipped out by Wells, Fargo
& Co. The brick was the result of two weeks' run
at the Golden Reward chlorination works.

BALD MOUNTAIN.—Superintendent Ellington
has a force of men at work on the Florence and has
encountered a large body of ore. The ore will not
average over \$20 a ton, but it is expected that it will
be richer as the body is farther penetrated.

GOLDEN WEDGE.—The Golden Reward com-
pany is taking ore from this mine and shipping it to
the chlorination works. The ore carries from \$35 to
\$40 a ton, and is one of the richest nines in the
company's group.

CARTHAGE.—Several men are working on the
Carthage mine and getting out a good quality of
ore. Shipments to Omaha will shortly begin.

IDAHO.

THE CLAYTON SMELTERS.—*Cor. Salt Lake Trib-*
une, Feb. 28: A. J. Crook, manager of the Clay-
ton (Idaho) smelters and the numerous mines be-
longing to that company, is in the city to spend two
or three days, on his way home from Omaha. He
reports the property of the company, especially their
mines, in excellent condition. Of course that coun-
try is all snowed under now, but the mines along
that portion of Salmon river are good enough to
make that a prosperous country were it supplied
with better and cheaper transportation facilities.

MONTANA.

AT BUTTE.—*Inter-Mountain*, Feb. 26: Of the
mines, all are working again as in the past, the Par-
rot having resumed Thursday, closing what had
seemed to be a shutdown for an indefinite time.
The mine is capable of supplying the smelter with
400 tons of ore every 24 hours. The smelter is sec-
ond to none in the county and the output is nearly
equal to that made by the Butte & Boston. The
Anaconda and St. Lawrence mines paid to-day and
distributed among their employees \$140,000 or over.
These mines are again working at their full capac-
ity and together with the Mountain Con. are em-
ploying more men than any similar number of the
same mines in the camp. The Lexington paid off
its bonds yesterday. This mine is pursuing the even
tenor of its way and work is progressing on the
deep levels. Ore sufficient is being taken from the
mine to keep the immense mill in continuous opera-
tion. There are only 12 men employed in the High
Ore, one of the most prominent of the Chambers
syndicate of mines. There is hardly any call for
ore from these mines until the reducing capacity of
the smelter at Anaconda is enlarged, as the output
of ore from all of these mines would simply swamp
the old works. All of the mines in the camp with
but few exceptions are running to their full capac-
ity, especially the large silver mines and mills on
the hill and to-day both are giving employment to
more practical miners than any other mining camp
in the country. The same may be said of the smelt-
ers, not one being in idleness, with the exception of
the old Bell out on the flat, a remnant of its former
greatness. Among the slag on the old dump, it is
stated, there is matte rich enough almost to make
some enterprising leaser wealthy. Very scattering
reports continually arrive from the mines situated in
the main range. The most noted of these are the
group over which C. H. Shoemaker is superintend-
ing the Homestake and the Maude S. This part
of the country is only in its infancy and by the time
another year rolls around the music of the mills will
be distinctly heard in its canyons. Of the Switzer
or Monitor little can be said, but it is understood
that the shaft in contemplation will be started just
as soon as the weather will permit and the disagree-
ment now existing in the company will have been
amicably adjusted. The mines of the Boston &
Montana Co. are in the same condition as during
last week. It is hoped that the big smelter at Great
Falls will be completed so as to accommodate the
vast number of miners that would be able to find
employment in the Moose, East and West Colusa,
Mountain View, Harris & Lloyd and the many other
valuable properties belonging to this corporation.
There are 5000 miners employed in Butte to-day.
The deepest shaft is the Lexington, which is 1448
feet. More ore is hoisted from the Parrot mine in
proportion to its machinery than from any other
mine in the camp. Sinking is progressing for the
1000 in the Mountain Consolidated.

NEW MEXICO.

COPPER.—*Sierra City Enterprise*, Feb. 28: M.
W. Neff & Co. blew in their copper smelter at the
Anson S. Mine, in Hanover Gulch, on Wednesday
evening with every prospect of a long and success-
ful run. They have on hand a large supply of coke
and smelter supplies and every available inch of
space around the mine and smelter is crowded with
ore, barely sufficient room being left for a wagon to
pull through on the road. The ore in sight in the
mine is of good quality and a large body is exposed
ready for extraction as soon as room can be made

on the dump or at the smelter. E. L. Doheny &
Co. have resumed work on the Alpha and
Omega properties of Houston and Thomas, near
Pinos Altos. Col. D. P. Casey, who has been in
charge of the Good Luck mine as foreman for
Brockman and Beall, will soon start work on his
own Little Bonanza at Cow Springs. May good
luck attend ye Kurnel. The Humboldt mill at
Shakespeare is being put in shape to commence
crushing ore. Frank Milstead is superintending the
job in person. About 15 men are employed at
Lone mountain chonding, that is, mining and as-
sorting the richest ore for shipment from the mines
of the camp, leaving large bodies of lower grade un-
touched. The ore must necessarily run very high to
pay cost of shipment and reduction at a smelter,
hundreds of miles away, and then leave a margin
for the miner, yet they are all making more than
good wages. The Colchis company's mill promises
some relief to our miners when completed, which it
is to be hoped will be very soon.

MOGOLDS.—The Little Fanny has another big
mark scored to her credit, a strike of richer ore than
heretofore discovered and in greater quantity having
been found in the lower level.

ALUMINUM CLAY.—*Salt Lake Tribune*, Feb. 26:
The question of getting clay rich enough in alum-
inum to pay for producing that metal is about to be
solved by one of the clay banks of Utah. The
Government has been testing clays, and even sent
to Canada for samples for this purpose, without
getting any very rich in aluminum. A short time
ago some parties got what they thought to be a
good article of fireclay and sent samples to the
Smithsonian Institute at Washington, and it was
found so rich in aluminum that the Government
officials want full particulars as to quantity and
location. The men who found this clay are going
to sink on it at once and do other prospect work,
and then they will be ready to let the secret of loca-
tion be known. The assay showed the highest per-
centage of aluminum ever tested in this country.

UTAH.

THE ANCHOR.—*Salt Lake Tribune*, Feb. 28:
The Anchor mine, Park City, is sending down from
105 to 110 tons of ore per day to the Union concen-
trator. They are driving the business so well that
the company does not permit a few snowslides to
stop the work, but just as soon as a slide blocks
the road men clean it out, and the heavily loaded
hobs and big teams soon pass as if all were serene.
Those Park City teamsters are not much afraid of
snow and are not frightened by snowslides.

BULLION-BECK AND CHAMPION.—C. J. Mulky
is in from the Bullion-Beck and Champion mine,
and says there was a big snow-storm over in the
Tintic country on Sunday. At the mine there are
employed about 250 men, to whom from \$22,000 to
\$23,000 per month is disbursed. Just now the
mine is not shipping much ore, because of the
prices of silver and lead, and in the past few days
the mine force has been reduced about 10 per cent,
leaving the force as named above, and there is a
probability of a further reduction if prices of silver
and lead do not rise soon.

The Mining Companies' Financial Standing.

The following is the financial standing on the first
Monday of the present month of the mining com-
panies listed on the two exchanges in this city:

COMSTOCK MINES—NEVADA.		
	Cash.	Debt.
Alpha	\$8 3,636	\$.....
Alta	23,729	16,688
Andes	1,316	17,377
Belcher .....	.....	6,369
Best & Belcher .....	.....	911
Bullion	2,202	.....
Caledonia	16,537	.....
Challenge Con. ....	.....	443,409
Chollar .....	.....	.....
Con. Cal. & Virginia .....	.....	22,681
Confidence .....	.....	33,320
Con. Imperial .....	.....	945
Con. New York	14,858	.....
Crown Point .....	.....	10,383
East Sierra Nevada .....	.....	14,337
Exchequer .....	.....	13,067
Gould & Curry .....	.....	2,802
Hale & Norcross .....	.....	1,231
Julia .....	.....	2,000
Justice .....	.....	3,559
Kentuck .....	.....	11,087
Lady Washington .....	.....	15,793
Mexican .....	.....	.....
Occidental .....	.....	.....
Ophir .....	.....	.....
Overman .....	.....	.....
Potosi .....	.....	118,721
Savage .....	.....	413,721
Scorpion	749	.....
Sgt. Belcher & Mides .....	.....	4,993
Silver Hill	5,914	.....
Sierra Nevada	26,991	.....
Union Con. ....	.....	3,688
Utah	4,794	.....
TUSCARORA MINES—NEVADA.		
Belle Isle .....	.....	A23,214
Commonwealth	7,199	.....
Del Monte .....	.....	6,080
Grand rize .....	.....	5,985
Indepndent .....	.....	2,091
Navajo .....	.....	6,655
Nevada Queen .....	.....	21,021
North Belle Isle .....	.....	20,307
North Commonwealth .....	.....	7,301
CANDELAIRA MINES—NEVADA.		
Holmes .....	.....	A43,294
BODIE MINES—CALIFORNIA.		
Bodie Con.	24,390	.....
Bulwer	A 568	.....
Mono	10,495	.....
Standard	A3,632	.....
Syndicate	3,451	.....
ARIZONA MINES.		
Crocker .....	.....	1286
Locomotive	457	.....
Peer	1,834	.....
Peerless	2,371	.....
Weldon	3,400	.....

* February expenses paid.
† Collecting assessment.
‡ Unsold bullion of the assay value of \$178,566.37 on
hand, with further shipments to arrive. There is an
overdraft at the Nevada Bank of \$104,707.09.
(A) Bullion returns for the month not all in.

MECHANICAL PROGRESS

Aluminum—Facts and Fiction.

The great advances recently made in the metallurgy of aluminum, by which the selling price of the pure metal has been reduced in six years from \$15 to \$2 per pound, or less, and that of its alloys reduced in even greater proportion, has led to an extensive use of the imagination by many newspaper writers and others, and a vast amount of misinformation concerning the metal has appeared in print. Scientific men even have been misled by the extravagant claims made for the new metal, and have allowed themselves to be quoted in a way which tends still further to mislead the general public. For instance, one of them predicts some day aluminum will revolutionize the world. It will be used in the construction of houses, thus superseding wood, stone and brick. It will take the place of iron in shipbuilding. The ocean steamer of to-day will be but a canal-boat compared with the aluminum ship that will fly as a bird over the waves.

In addition to this class of misinformation, which may innocently have been spread broadcast by enthusiasts, there have been cases of deliberate attempts to humbug the public by promoters of aluminum companies that never made a pound of aluminum.

After eliminating all the exaggeration and humbug about aluminum, there remain the facts that the metal possesses properties which make it very useful in the arts, that its use will enormously increase as it becomes better known and reduced in price, and that there are in actual existence new processes by which both the pure metal and its alloys may be made much more cheaply than they could be made five years ago. These processes are still capable of great improvement, and it is not at all improbable that five or ten years hence aluminum will be nearly as cheap as copper, and aluminum bronze as cheap as ordinary bronze.

There is no probability, however, that aluminum will ever replace steel as a material for bridges and other large structures, even if it ever should be made at as low a price as steel. In order to understand the barriers which exist against the cheap production of aluminum, it may be well to compare its processes of manufacture with the process of making pig-iron.

The Raw Material from Which Iron Is Made

Is iron ore, a chemical compound of iron and oxygen, mixed with various impurities, such as silica, alumina and lime. The iron ore is lavishly distributed over the earth's surface, and in many places its cost is merely that of digging it out of an open cut in the side of a hill. To separate the iron in the ore from its combined oxygen, we need a substance which has a greater affinity for oxygen than iron has, and this we find in the carbon of charcoal, coal or coke. With the temperature which may be obtained by the combustion of either of these fuels in an ordinary blast furnace, the iron ore is oxidized and carbonized, forming pig-iron, while the impurities above named run off in the slag. If the iron ore contains not over 30 per cent of these impurities it may be used directly in the blast furnace without concentration or any other preliminary treatment. The chief items in the cost of making pig-iron are therefore the mining of the iron ore and the coal, the quarrying of limestone for fluxing the impurities, the transportation of these materials to the furnace, the labor of charging them into the furnace, of removing the slag and the finished product, and the repairs of the plant. In favorable locations the total cost is as low as \$10 per ton at the furnace.

The Raw Material from Which Aluminum Is Made

Is also widely distributed over the earth, and consists in a chemical compound of aluminum and oxygen, with silica, iron and other substances, either in chemical combination or in admixture. A very impure ore of aluminum is ordinary clay. Purer ores are corundum and bauxite.

To separate the aluminum from its oxygen, however, is not as easy a matter as to separate the iron from iron ore. The heat of a blast furnace and the action of carbon will not do it. Some other means, therefore, must be found. Up to within the past few years metallic sodium was practically the only agent need for indirectly making this separation, the oxide being first converted into a chloride, and the chlorine then separated by the sodium; but as sodium is expensive, the cost of producing aluminum by this means was very great. Recently, however, it has been found that in the presence of carbon the heat of the electric arc was sufficient to separate aluminum and oxygen, and a process based upon this discovery has been used by the Cowles Electric Smelting Company, at Lockport, N. Y., for making aluminum alloys. It has also been found that if the pure compound of aluminum and oxygen, known as alumina, be dissolved by fusion in a bath consisting chiefly of melted fluoride of aluminum, the desired separation could be effected by electrolysis, a powerful current being required for the purpose. By this process, the Pittsburgh Reduction Company have been successful in producing nearly pure aluminum (about 98.5 per cent pure), and they are entitled to the credit of making the greatest reduction in the market price, bringing the price from \$8 down to \$2 per pound in one year, and of experimenting with the metal and making its qualities

known, so as to bring it into extensive use for a vast variety of purposes. The success of the electric method of producing aluminum has stimulated the owners of other processes to cheapen them, and means have also been found of producing sodium at lower prices than ever before, so that the sodium process is still holding its own in Europe, notwithstanding the competition of the electric processes.

In All the Aluminum Processes.

However, it is necessary to begin with a pure aluminum oxide, and as this is not found pure in nature, the impure oxide has to undergo a preliminary process of separation from its impurities. The reason this preliminary purification is necessary in the case of aluminum, while it is not in the case of iron, is that, whenever the conditions of separation of the aluminum from its combined oxygen are obtained, the same conditions will also separate the oxygen from the impurities, and the result will be not pure aluminum, but an alloy of this metal with the metallic base of the impurities. Thus, as oxide of iron is found as an impurity in native oxides of aluminum, such as bauxite or corundum, the attempt to make a product directly from such oxides by the electric arc, or by electrolysis, would result in the formation of an undesirable alloy of iron and aluminum, instead of the pure metal. The preliminary process of separation from impurities is a chemical one, and is necessarily somewhat expensive. It involves making a solution of the raw material by acids, the precipitation of the impurities from the solution, and finally the precipitation, drying and calcining of the pure alumina.

The cost of all these operations will, of course, be diminished in time, as machinery is applied to them, but it does not seem probable that these preliminary processes can be dispensed with, and hence the production of aluminum must always be much more expensive than the production of iron. It is not to be expected that any great revolution is to be made in the present methods of producing aluminum, and the cheapening of the metal in the future will likely be accomplished by the perfecting of existing methods. Moreover, it is not to be expected that any new method will be invented which is not already so covered by existing patents that it could not be used in practice without coming in conflict with them. There is, therefore, little hope that investors in new aluminum projects will ever reap any return from their investments.

The Field for Cheap Aluminum.

But if aluminum should ever be reduced in price to 10 or 15 cents a pound, as is claimed, what field is there for the metal at that price? It cannot possibly replace iron or steel as a structural metal, for even at 10 cents a pound it would be about five times as expensive per pound. If it be said that this largely offsets its being only one-third as heavy, and that the bulk of a pound is three times as great as that of a pound of steel, then it may be rejoined that it is only one-third as strong. It may replace silver, German silver, copper, tin and zinc for some of the purposes for which these metals are used, but by no means for all. It is too cheap to replace silver for coins and for high-priced tableware, but is excellent for moderate-priced wire. It will probably make a better roof than copper, tin or zinc, if it ever is as cheap as these metals, but is more fusible than copper, which makes it less useful for stoves, has less electric conductivity, making it less useful for electric wires, and thus far it has not been successfully brazed or soldered, in which respect it is inferior to nearly all other useful metals.

The Engineer, of London, expresses somewhat similar views concerning aluminum. It says: "More nonsense than enough has been talked about aluminum and its capabilities. It has served as the catchword of the ignorant enthusiast and the knavish empiric. Its wide diffusion, difficult extractibility, and remarkable properties seem to have appealed especially to that class of persons whose imaginative powers are largely in excess of their intellectual faculties, and, rushing in where angels fear to tread, they have been guilty of the wildest extravagances."

The same article gives some new facts concerning aluminum, which may eventually prove of some importance. It appears from some experiments made recently in France, that the strength of aluminum can be increased from about 25,000 pounds per square inch up to 52,000 pounds per square inch by alloying it with about six per cent of copper. The experiments were made on a small scale, however, and the same results might not be found true of large masses. It is only equal to the softest grades of steel in strength, and far below the strength of tempered steel.

The tensile strength of aluminum castings is about 15,000 to 17,000 pounds per square inch, or about the same as an ordinary quality of cast-iron. Castings hardened by drop forging have a strength of about 24,000 pounds per square inch. Rolled bars and sheets may have a strength varying from 20,000 to 32,000 pounds per square inch.

Aluminum is much weaker than the softest wrought-iron in compression, having an elastic limit under compression of only 3500 pounds per square inch when tested in short cylinders, and falling by flattening out at about 12,000 pounds. The metal is not a rigid metal, and no matter how cheaply it may in future be furnished, it would not be a safe material to use in large structures exposed to severe strains.

The most valuable properties of aluminum are its ductility under drawing processes and its non-liability to corrosion. It is insensible to a high degree of finish by polishing or burnishing. It becomes hard by working and requires frequent annealing. It melts perfectly fluid at about 1300°, but becomes granular at about 1000° F. It is most easily worked at a temperature of from 200° to 300°. It is apt to become granular and to stick to the rolls at a higher temperature.

As to the corrodibility of the metal, it is unaffected by either dry or moist air, by water, by sulphureted hydrogen or other sulphur vapors, by salt sea water, a weak solution of salt in acetic acid, or by sulphuric or nitric acids. These acids, however, rapidly act upon the metal in the presence of chlorine.

The alloys of aluminum with other metals have many valuable properties, and there are probably many other useful alloys of the metal yet to be discovered.

Aluminum has enough valuable properties, therefore, to make its cheap production a great boon to many arts and industries, but there is no ground for believing that it will "revolutionize the world."—*American Mechanist*.

SCIENTIFIC PROGRESS.

The End of the World

Of all changes, that change has most interest for us which affects our own planet, the earth. It has reached a later stage than Saturn, though not so late a stage as the moon; but only in long ages and by minute effects will further changes be noted. Ages hence it may be discovered that there is some slight change in the earth's orbit; or Mercury, yet nearer to the sun than we, may be seen to pursue a smaller orbit than now, and the terrible fact may come home to man that we are drawing nearer to the sun. Time goes on, and the tropics become too hot for existence, and colder regions find a welcome change to warmth. Age after age goes by, and the end is, visibly, no nearer; but the figures of astronomers only too surely tell their tale. In time the tropics will become an impassable desert and all the life on the globe will congregate around the poles. Spain has lost her vineyards and the Alps their snow; England is a burning desert and Greenland teems with the vegetation of the tropics; in smaller and smaller circles the inhabitants gather round the poles.

"But," to quote the words of Mr. Kelghley Miller, "the narrowed limits of the habitable earth can no longer support this vast increase of population, and famine begins to mow down its victims by millions. Now, indeed, the end of all life draws on apace. The heat and drought become more and more insupportable, rain and dew fall no longer. All springs of water fail, and the rivers dwindle down to streamlets and trickle slowly over their stony beds, and now scarcity of water is added to scarcity of food. Those who escape from the famine, perish by the drought, and those who escape the drought are reserved for a fate more awful yet. For a time the few remaining inhabitants are partially screened from the overwhelming power of the sun by a dense canopy of clouds formed by the evaporation of every lake and sea. But soon the sun scorches up these vapor banks and dissipates them into space as fast as they can form. Then the fiery orb shines out in an unutterable splendor without the slightest cloud-wreath to interpose between himself and his victims. Then the last denizens of the world are stricken down and consumed—the last traces of organic life are blotted from its surface."—*Loughman's Magazine*.

But we "won't worry about it."

Gun Cotton and How It Is Used.

Prof. Munroe recently gave before the London Institute of Boston a very interesting and instructive lecture on the manufacture, use and power of gun cotton.

The lecturer traced the experiments with the explosive from its discovery, in 1832, up to the present time, and spoke of several of the most fatal explosions which attended the experimental stage.

After experiments by Prof. Hill, of the United States torpedo station, gun cotton was adopted as an explosive for use in the navy in 1854. In preparing it for this service the gun cotton is, by successive pressings in hydraulic presses, the last of which has a pressure of 6800 pounds to the square inch, made into little blocks measuring $2\frac{1}{2}$ inches each way. It contains from 10 to 16 per cent of water, but when issued to the service contains 35 per cent. Before being made up into blocks it is carefully tested.

Prof. Munroe declared that gun cotton, correctly prepared and handled according to directions, was the safest of the explosives to use. It was dangerous only when the materials had not been thoroughly purified, or the union of acid and cotton incomplete.

In proof of what could be done with it, a picture was thrown upon the screen showing the workman cutting it with chisel, jig saw and lathe to fit it into a shell. Another illustration was the extinguishing of a block that was burning by pouring water upon it. Two thousand pounds of it had been burned in a bonfire without an explosion.

One volume of the explosive gives 829 of the gas, and the pressure developed by combustion

is 81 tons to the square inch, and by detonation is 157.5 tons, the latter being in contact however. The effect of the explosion of one particle on another is so rapid that it would take only one second for it to pass through 19,000 feet of the explosive.

It was shown by the stereopticon that the letters U. S. N., with the date of manufacture that are on the bottom of each block may be impressed upon an iron plate upon which the gun cotton may be exploded. It is a curious fact that, if the marks on the blocks are in relief, the reproduction on the iron will be raised, and, if cut in, there will be an indentation on the plate. Prof. Munroe's theory is that when the letters are cut into the explosive the gases generated in the indentations are hurled from them as a projectile from a gun. If a leaf or a delicate piece of lace be laid between the gun cotton and the iron, its impress will be left in all the perfection of outline of the original, though the article itself is absolutely annihilated.

The Artificial Production of Indigo.

Synthetic chemistry or the artificial production of materials usually found more or less perfectly developed by nature, are becoming quite common, and developing more and more the economical value to men of chemical science. Day by day, the chemist is bringing to the notice of the world more surprises in the artificial production of substances hitherto only available through the chemistry of nature.

Most of our flavoring products and many syrups and sugars are now artificially produced. A great number of artificial products, possessing valuable medicinal properties, are now to be found on the shelves of our druggists. Quite recently a compound has been artificially devised which possesses tonic properties more powerful than those of any medicine hitherto known. It is now considered within the range of early possibility that important foodstuffs may soon be obtained from the laboratories of chemists.

In the matter of the production of colors for dyeing purposes, the chemist has now so much clearer field. All he needs for his raw material is the waste from bituminous coal. Out of that black, unsavory waste he materializes nearly all the colors of the rainbow, and each in almost infinite varieties of shades.

In addition to what has long been done in this direction, the artificial production of indigo seems now in a fair way to drive the vegetable indigo products to the wall. An interesting communication upon the artificial production of indigo has recently come from Mr. I. van Levenstein, who states that "there is no difficulty whatever in carrying out this beautiful discovery, but the yields are poor in consequence of the great destruction of material before the glycerine is converted into indigo. Notwithstanding this fact, the fate of the indigo planter is still in the balance, and the danger which is ahead of him does not rest so much with the synthetical production of indigo, but must be looked for in the improvement in the production of blue coal-tar colors, which are constantly being brought out. We already possess more than one coal-tar color, which has, to some extent, taken the place of indigo, and there is not the slightest doubt that before long chemists will be successful in further improving the processes of manufacturing these blue coloring matters, which may not only possess the valuable dyeing properties of indigo, but may even surpass the latter."

Indigo has become a most important commercial product, representing an annual value of over \$20,000,000, and constantly increasing. The production of artificial dyes is confined almost exclusively to Europe. Why should not our American chemists turn their attention more closely to this industry? The field is wide and of almost indefinite value.

THEORIES OF COAL COMPOSITION.—It is now asserted that the attempt which has been made by certain eminent German chemists to connect the physical phenomenon of coking with the chemical composition of bituminous coal—especially with reference to the richness of the coal in what is called disposable hydrogen, or that proportion of it which is in excess of the quantity required to form water with the oxygen present—does not correspond with observed results. Nor, again, does the richness of a sample of coke in carbon determine its coking qualities, the fact being that two specimens of coal, of practically identical carbon composition, are often to be found to behave very differently in the retorts of coke ovens. It is, therefore, argued that, if the property of coking does not reside either in the surplus hydrogen or the fixed carbon, it is certainly not to be found in the contents of the coal in oxygen, which give no indication whatever of the physical behavior of the coal under heat. Some coking coals coke without much swelling, while others swell considerably in the process. In either case, the coal must undergo a stage of fusion, in which it becomes a thick, semi-fluid mass, through which the gas escapes. But why one kind of coal should swell considerably, while another variety of similar composition does not, is admitted to be a problem not apparently capable of solution from any of the chemical data usually preserved in analyses of coals.—*Iron, London*.

THREE NEW ASTEROIDS were discovered by European observers during the second week in February. The magnitude of one was 13, of the other two, 10.

USEFUL INFORMATION.

TATTOO MARKS CANNOT BE REMOVED.—It has often been claimed that tattoo marks may be removed by pricking over them with goat's milk. This is a mistaken idea. Chemists and others have for years experimented with various preparations in the hope of discovering some agent to wholly remove India-ink marks from the human skin. Nothing, however, has as yet been found that will remove a portion even of the objectionable marks, unless, possibly, the attempt be made immediately following the tattooing process. At Mount Washington University Hospital, Baltimore, an experiment was some years ago made in presence of the writer upon the forearm of a noted character of that city who died there. Before his death the man granted permission to the students of the university to experiment as they saw fit with his dead body. One of these students, curious to learn everything possible connected with the practice of tattooing, cut from the dead man's arm a strip of skin upon which a coat-of-arms appeared. Beneath the skin the design remained visible. By degrees the flesh was removed, the design in India ink still remaining in sight until finally the bone was reached. After a thorough sponging for the purpose of removing the blood and pieces of flesh remaining, it was found that the representation still appeared. After cutting away a small section of the bone, the India-ink mark was found to have not penetrated beyond.—*Boston Bulletin.*

SMOKE PREVENTION IN LONDON.—Considerable success is attending the experiments now being made on the Thames embankment, London, in preventing the emission of smoke from steam-making plants. The London *Engineer*, speaking of it, says: The apparatus consists of a fan which passes the products of combustion from the fire of a portable engine into a chamber partly filled with water. The products enter a horizontal perforated tube which is partly immersed in water in this chamber, and is rotated at about 200 revolutions per minute. Upon this tube are arms carrying perforated sheet iron, so that by the rotation of the tube and these arms the water is thrown up in fine spray, through which the smoke must pass on its way to an exit from the upper part of the chamber. Perforated plates are also placed in the upper part of this vessel, through which the escaping gases must pass, and which throw down the water. The high temperature of the products of combustion which enter this chamber causes the evaporation of some of the water, which passes away as vapor at atmospheric pressure. The products of combustion, or smoke, are robbed of all carbonaceous material, and, to some extent, of other deleterious constituents, including sulphur. These collect in the water and form a scum, which is constantly drawn off. It is proved that smoke can be treated in this way, and it is claimed that the cost is small enough to commend the system and apparatus.

CHITTIM BARK.—It is not generally known that quite a large business is done in some parts of Oregon in chittim bark. It is only within recent years that it became known that there is a market for this bark. It is produced in considerable quantities along many of the streams of Oregon. It grows abundantly in Benton county, especially in that portion of the county lying west of the coast mountains. The trees are stripped in spring from top to root. The bark is taken in convenient lengths for handling. After it is dried it is usually sold by its first owners in that condition. It is ground fine and enters largely into the manufacture of certain medicines. The price of the raw material varies considerably with the season. In the spring, when the market is crowded, it reaches its lowest point, and in the fall and winter usually advances. Last spring it sold in San Francisco at \$70 a ton, which was considered a very low figure.—*Oregon Paper.*

PHOTOGRAPHY AND SURGERY.—Strange as it may seem, photography has become a most valuable adjunct to surgery. Scientists have recently discovered that spasms are caused by affections of the nerve centers, and that the disturbance of a certain center is invariably followed by identically similar contortions of the muscles. Tumors on the brain are now located, according to an eminent local surgeon, by means of the instantaneous photograph. A tumor must of necessity press upon a nerve center, which causes the sufferer to be subject to violent spasmodic attacks. While in this condition he is photographed, and the exact position of the tumor discovered. Several successful experiments of this nature have been conducted, and henceforth the camera will play an important part in surgery.

INVENTIONS AND INTELLIGENCE.—The records of the Patent Office make some peculiar revelations. The annual report of the Commissioner, just issued from the Government Printing Office, shows that in a twelvemonth Massachusetts took one patent for every 573 persons of her population, while Mississippi took one for every 23,574. Connecticut is credited with one patent for every 700 of her population, and Alabama with but one for every 16,611. New York takes one for every 1185 and North Carolina one for every 19,714. Thus the figures show that the States where general intelligence most widely prevails are granted the largest number of patents.

GOOD HEALTH.

A CURIOUS CASE.—The New York Associated Press reports of Feb. 24th state that Frederick Gaedke was then dying at the Presbyterian Hospital, New York, from a disease rarely seen in this country. It is called osteomalacia, which means the complete breaking up of the entire bony structure of the body. A few evenings previous his wife lifted Gaedke in his bed. She took hold of the right thigh bone and it snapped like a pipestem close to the hip joint. Gaedke fainted from the pain and was taken to the hospital. He was recently bitten on the finger by a mouse. He caught cold and the entire band became inflamed and very painful. After while it healed apparently. Three months ago Gaedke had to take to his bed, being afflicted by what was thought to be muscular rheumatism, and his body was racked by lacerating pains and the flesh became sore. He could not be moved nor even touched without being thrown into convulsions. This condition continued for several weeks and then a slight swelling appeared in the glands of the neck. The swelling in the neck was not understood at the time, but it is now known that it was caused by the establishment of a little colony of tubercular vesicles in the glands. These little micro-organisms had doubtless originated in one of the lungs and had started from there to make the conquest of his body, finally destroying the animal matter of the bones and leaving only the mineral substance, which has rendered them chalky and extremely brittle.

COCONUT FOR TAPEWORM.—Prof. Parisi of Athens some time since called attention to the tannic properties of the coconut, when freely ingested. His attention was drawn to the subject from an accidental experience in his own case. While traveling in Abyssinia, he one day took a considerable quantity of the nut, sufficient to produce an attack of diarrhea. After awhile, much to his surprise, with one of these diarrheal motions, there came away a complete tanna, head and all, and quite dead. After his return to Athens he made some observations in this line of treatment, and reported an almost invariable success. In only one instance did he fail to secure the head. His method was to order the milk and pulp of one coconut, to be taken in the morning, fasting, no purgation or cessation from business being required. In this country Dr. Allison has reported, in the *Medical Age*, a case where the use of *Felix mas*, oil of turpentine, and chloroform had successively failed to effect a complete removal of the parasite, but in which the patient by chance partook of a coconut, and soon after was relieved of a dead tapeworm with its head. Since then he has had occasion to prescribe coconut in this trouble, and has found it the pleasantest of all the tannic acids, and one that does not require the administration of a cathartic.—*N. Y. Medical Journal.*

A CURE FOR HANG NAIL.—A small and almost imperceptible hang-nail often involves the owner of the hand which bears it an endless amount of annoyance and vexation. It is the general rule—manicures to the contrary, notwithstanding—that the nails least attended are better than those that are continually doctored. The man who cuts a hang-nail in nine cases out of ten lays the way for a much more vigorous successor. Satisfactory results are almost always obtained by pushing the skin back from the nail after washing the hands. The dry end of the towel should be taken and the skin pressed back wherever it overruns the nail. This breaks its adhesiveness to the nail and makes hang-nails impossible. Where the skin is allowed to grow fast to the nail, trouble invariably results, because the nail in growing out pulls the skin with it, and when it breaks from the tension the hang-nail is formed.—*Phila. Inquirer.*

THE EFFECT OF SUNLIGHT.—A man who has been annoyed for years by the fact that one side of his mustache grows about twice as fast as the other side claims to have found an explanation in the circumstance that he sits all day at his desk with one side of his face turned to a window, the light from which stimulates the growth of the hair on that side.

"MIRACULOUS" CURES.—The invalid girl, in a Pennsylvania town, who arose from her bed and rushed out of the house when the alarm was given that the place was on fire, simply proved the influence of mind over body. Great danger, like extreme religious enthusiasm, frequently works what have the appearance of miraculous cures, but science readily explains them.

LINSEED OIL FOR CHILBLAINS.—Mr. A. J. Arnold of Gibsonville, Idaho, in a letter to the Press, gives the following from his experience in curing chilblains: Take boiled linseed oil; warm the foot before a fire, then rub in the oil thoroughly. The pains will soon cease and if persevered in the trouble will soon entirely disappear.

SHORTHAND WRITING by machinery is as yet a novelty in Great Britain. It is, however, alleged that a new stenographic machine in use by the Italian Parliament is capable of recording 250 words a minute, and can be readily manipulated by a blind person.

ENGINEERING NOTES.

IMPROVED TRAVELING FACILITIES.—Late accounts from Russia say that the Government is pushing forward its project for a railway through Siberia. Several hundred miles of the line are already completed. But there is a very large gap to be filled, as it is nearly if not quite 4000 miles from the end of the present line to the eastern coast, where the railway is intended to terminate. Generally speaking, the country is a vast plain, and therefore an easy one for the construction of a railway. There are only two or three mountain chains in the whole distance, and these offer no more obstacles than are presented in this country by the Alleghenies and far less than those of the Rocky mountains and the Sierras. When the railway is completed so that one can travel by train from Vladivostok to St. Petersburg, the time around the world will be materially shortened. With steamers making direct connection between Vladivostok and San Francisco, the journey from New York to New York again can be made inside of 45 days, and may easily be brought down to 40 days if the steamers and trains run at fair speed, and do not keep the traveler waiting too long in the connecting ports. How the world moves! Yesterday the writer picked up a book upon California, written in 1850, in which the author said: "I venture the prediction that the time will yet come when men now living may go from New York to San Francisco in less than 30 days." I might be inclined to laugh at him, now that we have reduced the journey to 4½ days, were it not for the fact that in a book of my own, written 24 years ago, I find that I spoke of the possibility of going around the world in "scarcely more than 100 days."

A NEW PROPELLER SCREW has recently been devised by Mr. Ruble of Newark, N. J., which is being placed in a boat 100 feet long by 20 beam. The screw consists of four blades firmly riveted to a buoyant and air-tight cylinder of boiler iron having conical ends. Two of these screws, each six feet in diameter, will propel the new boat, Mr. Ruble thinks, at the rate of 23 miles an hour. The peculiarity of this form of screw is that it is not intended for total submergence, but will lie partly above the surface, one-half to two-thirds being submerged. The inventor says his wheel, running in this manner, will not churn, and will move with the slightest degree of slip while applying the full energy to be developed from a wheel of a given diameter and doing it with one-fifth of the power needed to run an ordinary screw. Owners of steam launches, tug-boats and other screw-propelled craft are watching the progress of the work on the new boat, and waiting for the trial which will take place on the Passaic next month. Mr. Ruble is very confident of success with his new propeller, claiming that he has already met with the most satisfactory experiments on a small scale.

A GREAT BRIDGE.—The great steel bridge across the Columbia river at Vancouver will be a mammoth concern. It will be 6000 feet from the Washington to the Oregon shore; it will be double-tracked with roadway on top for teams, and will be erected upon pneumatic piers. The pivotal pier, or draw pier, will support a draw which will give an opening of 200 feet space on either side for vessels to pass, and the span immediately south of the draw span will be 375 feet. Whole structure to be of steel, built 10 feet above the high water of 1876, and 40 feet above low water. On account of the sandy formation it will be necessary to go down 80 feet below low water to get a firm foundation. This gigantic structure will cost over \$1,000,000. It will be Jan. 1, 1892, before the cars can pass over it. The company is pushing the bridge and also the road as fast as men and money and their present perfected plans will permit.

NINETY FOUR MILES AN HOUR.—Charles Watts, superintendent of the Chicago division of the Pittsburg, Fort Wayne & Chicago road, claims that the fastest time ever made on an American railway was over that road lately. His official report showed that this special train ran 53 miles in 45 minutes, 11 miles of which were covered in seven minutes, or at an average speed of 94 miles an hour. The train sheets show that the above statement is correct.—*St. Louis paper, Feb. 9.*

EXPERIMENTS are now in progress to test the geological structure of the sea bed upon which it is proposed to construct the bridge across the English channel. Examinations of the French coast have been finished, and so far as they have proceeded on the English side of the channel the results have been highly satisfactory, the sea bottom being very solid and suitable for the proposed structure.

THE GREAT BROOKLYN BRIDGE is a success far beyond what was ever expected of it. The trustees are now pushing the plans lately adopted for the issuance of \$1,500,000 bonds for the improvement in the carrying capacity of the bridge, and \$1,000,000 bonds for the approaches.

THE GREATEST DISTANCE recorded at which the sound of cannon has been heard was on the 4th of December, 1832, when the cannon of Antwerp were heard in the Erz-Gebirge mountains, at a distance of 370 miles.

ELECTRICITY.

EARLY INSULATION OF ELECTRIC WIRES.—Mr. Davenport, a Vermont blacksmith, is said to have been the first person to conceive the idea of an electric motor. His idea first began to take shape some 50 years ago, according to the authority of Mr. F. L. Pope, in the *Electrical Engineer*. While at work upon his invention he found it necessary to insulate his wires. Being poor and almost without means, his wife gave him her wedding dress as a thing less needed than anything else, which he tore into strips and wound about his wires. This first effort at insulation was followed soon afterward by an employe of Morse who found it necessary to insulate the wires of his pioneer telegraph between Washington and Baltimore. To do so he employed several men to start out from Washington with brushes and tar-buckets to cover the wires with tar. They had a hard job of it and met with much wonderment and no little jeering. No "tavern" on the route would give them and their tar-buckets any hospitality, and the men were obliged to secure food and lodging as best they could as they worked slowly over the route. That was in 1846. Later, waxed cloth was used to insulate at the point where the wires met the suspension pins. The only result of that trial was that the bees from all the country round made a dead set at the waxed rags, and in a short time were reveling in a beeswax boom that seemed without end. Their millennium came to an untimely close with the October frosts, and waxed rag insulation of that kind passed into history.

PHONOGRAPHY VS. STENOGRAPHY.—Short-hand writing, says London *Colonies and India*, will soon be a thing of the past. Heads of firms and confidential clerks now talk their letters to the phonograph, which dictates them to the typewriter. The waxen cylinders can be stored away, and are more reliable in case of dispute than shorthand notes. Indeed, it will not be long before the phonograph pushes stenography completely in the background. The reporter stood a few yards from the speakers and repeated the speeches into one of the machines until the cylinder was covered by the mystic indentations. Then the operator turned to the other machine and talked into that while the first cylinder was removed and placed in the bands of the typewriter.

AN ELECTRIC TRICYCLE.—There is now being perfected in Boston, an electric tricycle which promises great things. The tricycle is made possible by a recently invented motor, which, weight for weight and bulk for bulk, is said to be about twice as powerful as those of the old models. The machine has now reached a point where it can be run for a distance of from 50 to 60 miles without the storage battery, which furnishes the current, being recharged. Those interested confidently predict that when the machine is placed upon the market it will be provided with a battery powerful enough to propel the machine for a distance of at least 100 miles. The tricycle, it is said, will be offered to the public next spring.

ELECTRIC ROADS.—The San Francisco & San Mateo railway company has been incorporated to build an electric road along the route of the franchises granted to B. Joet et al. by San Francisco and San Mateo counties. The capital stock is \$2,000,000, of which \$40,000 have been paid up. The Governor has signed what is known as the "Electric Motor Bill," making the use of electric motors on city roads lawful, and granting that street railway lines may be operated for a distance of four blocks on the same thoroughfare.

ELECTRICITY IN FARMING.—The idea of utilizing electricity for the fertilization of land is not by any means new, but it has been reserved for Spain to inaugurate a new use of the electric motor in plowing land. Such a plant has been set up on the property of the Marquis de la Laguna. A water-wheel of about twenty-horse power will be used for the generation of the current, and the plow will be worked at a distance of three miles from the generating dynamo.

ELECTRIC VS. CABLE.—It is stated that there are now in operation in the United States 260 miles of electric street railroads, which is five miles more than is operated by cables. There are five different systems of electric roads now in operation—the Thomson-Houston, the Sprague or Edison, the Short, the Westinghouse and the Roe.

A NEW ELECTRIC WELDING SYSTEM.—It is said that M. Paul Hobo and a M. Lagrange, an officer in the engineers, have devised a system of electric welding which is essentially different, so it is stated, from that of Elihu Thomson. The Hobo-Lagrange process will be worked in Belgium by the Julien company.

LIGHTNING.—Prof. Bidwell, writing in *Nature* of lightning, quotes figures showing that in England and Wales, from 1852 to 1880, the average annual death rate from lightning was considerably below one per million of the population.

ENGLISH ELECTRIC COMPANIES.—During the year 1890 more than 120 new companies connected with electrical engineering were registered in England, the total capitalization being upward of \$65,000,000.



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Saturday, March 7, 1891.

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[NEW THIS ISSUE.]

Gas Engines—M. A. Graham.
Assessment Notice—Crescent Mill and Mining Co.
Diamond Drills—The Pacific Prospecting Co.
Dividend Notice—Pacific Coast Borax Co.

See Advertising Columns.

Passing Events.

The late heavy fall of snow in the Sierra Nevada mountains insures a good milling stage of water in the Carson river all summer. On this side of the range, too, there will be plenty of water for the quartz and drift mines of the mountain counties.

The floods in Arizona have been very disastrous. At Yuma some 1500 people are homeless. The Gila and Colorado rivers have both overflowed their banks. In other parts of the Territory much damage has also been done. In the southern portion of this State bridges have been washed away and some property destroyed. The railroad companies have been the heaviest losers.

In the death of Senator Hearst California loses one of her most prominent pioneer miners. This gentleman was a legitimate miner rather than mining-stock dealer, and has developed properties all over the coast, employing many hundreds of men and amassing a very large fortune from his mining investments.

The outlook for the mining season is excellent and the probabilities are that California will increase her gold product this year in view of the many old quartz properties being reopened and the increased interest in drift mining.

The Idaho Mining Company of Grass Valley has declared dividend No. 251 of \$2.50 per share, which amounts to \$7,750.

Production of Precious Metals—1890.

Edward O. Leech, the Director of the Mint, has submitted to Congress a report on the production of the precious metals for the calendar year 1890.

The gold product of the United States was 1,588,880 fine ounces (Troy), of the value of \$32,345,000, an increase of \$45,000 over the product of the preceding year.

The silver product of our own mines approximated 54,500,000 ounces, corresponding, at the average price of silver during the year, to \$57,225,000, and at the coining value of silver, to \$70,464,645, against a product of 50,000,000 fine ounces of the commercial value of \$46,750,000, and coining value of \$64,464,464, in the preceding year, an increase of 4,500,000 ounces in the silver product of the United States last year.

The silver product of our smelters and refineries was 64,920,927 fine ounces.

The total value of the gold deposited at the Mints during the calendar year was \$56,217,105.82, of which \$31,234,342.60 was domestic bullion, \$4,352,422.70 foreign gold bullion, \$8,857,447.61 foreign gold coin, \$558,386.85 light-weight domestic gold coins, \$3,765,364.28 old jewelry, plate, etc., and \$7,449,141.78 re-deposits.

The coinage executed during the last calendar year was the largest in the history of the Mint service, aggregating 124,025,365 pieces of the value of \$61,054,882.84.

The total gold imports were \$20,379,456. Exports, \$24,095,163, a net loss of \$3,715,712.

The total silver imports aggregated \$30,782,531. Exports, \$26,614,003, a gain of silver of \$4,168,528.

The lead ores imported into the United States contained 36,231,731 pounds of metallic lead and \$7,252,442 in silver.

The amount of precious metals used in the arts in the United States during the calendar year was—gold, \$18,105,901; silver, \$9,231,178, of which \$10,717,472 gold, and \$7,143,635 silver, was new bullion.

The metallic stock of the United States was approximately, on January 1, 1891:

Gold.....	\$704,597,123
Silver.....	486,545,074
Total.....	\$1,191,142,204

Owing to the brief time since the close of the last calendar year, statistics of the product of gold and silver in the world, by producing countries, for the calendar year 1890 are not complete.

Complete returns, however, have been received from Russia, Australasia, South Africa, British India, Venezuela and a few other countries based upon which the Director estimates, as a mere approximation, that the gold product of the world for the calendar year 1890 was \$118,490,000, a falling off of \$3,007,000 from 1889; and that the silver product of the world was 130,650,000 fine ounces, an increase of 7,859,375 fine ounces over 1889.

The report is replete with valuable statistics on the production, coinage and movement of the precious metals throughout the world.

The Course of Silver.

There was a marked improvement in the price of silver during the past calendar year, the price reaching the highest point in 12 years. The fluctuations covered a range of 26 per cent, a wider range by far, than in any previous year. At the commencement of the year, silver was quoted at \$0.96 per fine ounce. It reached \$1.21 on August 19, and closed on December 31 at \$1.04½.

The average price during the year was, in London \$1.04½; in New York, \$1.05.

At the lowest price reached during the year the value of the silver contained in the silver dollar was \$0.74½; at the highest price \$0.92½; the average price \$0.80½. The shipments of silver to India, China and the Straits from London amounted to \$41,398,000 during the year. The amount of Indian Council Bills sold aggregated \$76,890,000.

The imports of silver aggregated \$30,782,531. Exports, \$26,614,003, a gain of silver of \$4,168,528. During last year we used \$9,231,178 silver in the arts, of which \$7,143,635 was new bullion. The stock of silver in the United States on Jan. 1st last was \$486,545,076. The United States Mint coined last year \$38,043,004 in silver dollars, and \$1,159,904.20 in sub-

siary coin. The Mint also manufactured silver bars of a value of \$9,094,592.54.

The total amount of silver offered for sale to the Government during the year was 68,130,457 fine ounces, and the amount purchased 37,594,373.75 fine ounces, costing \$39,991,840.80, the average cost being \$1.06 per fine ounce.

The Late Senator Hearst.

After a long illness, Senator George Hearst of California died at his residence in Washington on Saturday night. Senator Hearst was well and favorably known to the mining community of this coast, he having been closely identified with the mining interests since the pioneer days of this State. He was placer-mining at Placerville, El Dorado county, as early as 1850, and the quartz-mill he erected was among the first built and operated in California. He was in Nevada county when the Washoe excitement broke out, and his party, including Melville Attwood, Judge Walsh and A. E. Head, was the second to arrive there from California. He obtained interests in the lode which proved profitable, and he also was successful in mining ventures in Pioche and in Eureka. Mr. Hearst had his ups and downs financially for some years, and in 1872 joined J. B. Haggin in the purchase of the famous Ontario mine of Utah, which has yielded \$23,000,000 of silver and paid \$11,000,000 in dividends. The Daly mine, another dividend-paying property, was also purchased, and these two mines laid the foundation of Mr. Hearst's large fortune. Messrs. Haggin and Hearst next purchased the Homestake mine on the Black Hills of Dakota, where they put up one of the largest mills in the United States. This mine has also paid handsomely.

The most important mining purchases made by Mr. Hearst and his partner was the world-famous Anaconda copper mine, Montana. This mine has a plant which is valued at some \$5,000,000, and has paid its owners immense sums of money in dividends. The output is larger than that of any other copper mine in the world.

Mr. Hearst has made many other investments in mines in about all of the Pacific Coast States and Territories. He has also made large investments in land in California, New Mexico and Mexico.

Mr. Hearst never took the management of any one mine, and made few locations of his own. But he was always ready to purchase and to sell. Messrs. Hearst and Haggin were very successful in mining, and adopted two rules to which they rigidly adhered. In the first place, they never bought interests in a mine, nor shares in properties which were controlled by others. When they purchased, they purchased the whole, kept it, and managed it themselves. Occasionally they sold an interest, or a few shares, to their superintendents or the public, but they kept the control in their own hands.

Secondly, Mr. Hearst was never willing to give for a mine more than the value of the ore that was in sight. When owners, seeking to sell, urged that the invisible supply of ore was probably larger than the ore in sight, and should be considered in the purchase-money, Mr. Hearst would reply: "That's why we are willing to buy. If there is no more ore in your mine than I can see, we shall make a bad bargain in paying you the value of that visible ore for the property." When the owner retorted that if he was to get no more for his mine than he could see in it, he had better keep it and work it himself, Mr. Hearst would bid him do so. "We," he would say, "are not hankering after your mine. We think well enough of it to give you in cash down the money which you can take out of it in three or four years' work. We look to the invisible supply for our profit. But we haven't the least objection to your taking both the visible and invisible supply. We can find other uses for our money."

Mr. Hearst was a very plain man and his wealth did not in the least change his character. He was always approachable and always charitable. Many an old prospector or miner, or old pioneer "down on his luck," has had cause to thank him. The phrase of "honest miner" was aptly applied to him, for it has been truly said the accumulation of his fortune was not in any way due to the losses of others. He was not a stock-dealer, but made his fortune by legitimate investments in mines and their practical development.

Silver Legislation.

Congress adjourned on Wednesday of the present week without further legislation on silver. There is no denying that metallists were sanguine of passing a free-coinage bill up to the time when ex-President Cleveland wrote his short but pointed letter taking grounds against unlimited coinage of silver by this country. With the ex-President's stand against unlimited coinage of silver, under the belief that the time is not ripe for such a measure, leading bimetallics evidently did not make much of an effort to promote further legislation by this Congress, well knowing that the next Congress is pledged to free coinage, and if President Harrison vetoes a free-coinage bill they will have a sufficient majority in both houses to pass the bill over his head. Indeed, several leading bimetallic papers at the West were outspoken in advising that legislation be not forced this session, claiming that with the Grange, Farmers' Alliance and Knights of Labor working in harmony to secure the free coinage of silver, large numbers are being proselytized, which will bring about the early consummation of their efforts in that direction.

Events within the past two months have, outside of Congressional legislation, put an entirely different phase on the silver situation. The present output of the mines in this country is claimed by well-informed parties to be not more than, if as much as, the Government's monthly purchases, and with our product being cared for by the Government, foreign buyers will soon absorb the available surplus of the world, besides taking the output of other silver-producing countries. Already free buying by India, China and Japan is setting in, while two other nations are quietly securing round procons. It is said, in well-informed financial circles, that foreign purchases this spring will be unusually heavy and in consequence prices will steadily advance.

In this city, the first time since May, 1890, foreign buyers are in the market for silver bullion. India and China have agents here securing all they can at reasonable figures—even paying an advance over Mint quotations. It is also said that there is a speculative inquiry for silver coming from parties who believe in much higher prices.

Bearing on the present status of the market, we give the following from the New York *Tribune* of Feb. 26th:

The silver pool in New York is reported to have lost heavily from the collapse of the Anti-Free Coinage bill in Congress. At the outset of the scheme silver jumped up rapidly until it was quoted at \$1.21½ per ounce, and the metal was expected to rise to \$1.29, equal to a dollar in gold. At length silver was stored in New York to the extent of about 10,000,000 ounces, including 7,333,000 in the vaults of the Mercantile Safe Deposit Co. It is said that the average cost to the speculators has been about \$1.10 an ounce. To prevent importations, they have been compelled to keep the Government supplied, and their sales have realized, on an average, only about \$1.05 an ounce. They are, therefore, out five cents an ounce on their transactions, or say \$2,500,000, including storage charges and interest.

The above indicates that the big bugaboo of large holdings at the East has dwindled, under selling, to very small proportions.

SILVER MINES BOUGHT.—It is announced at Chicago that papers have just been signed for the transfer of the silver mines known as Badger, Porcupine and West End, located at Port Arthur, Ontario, to Herbert M. Nichols of Denver, who is said to be acting for a syndicate composed of Englishmen and Americans. The single sale, it is said, aggregates an amount approximating \$10,000,000. These three mines produce one-half the silver taken from the Port Arthur district. The operations of this syndicate are the direct result, it is said, of the silver legislation in the United States, and negotiations, it is claimed, are now under way for some important mining properties in Old Mexico and Colorado.

THE Legislature has made an appropriation of \$20,000 to fit up and preserve the old Sutter Fort, which stands in the city of Sacramento, between Twenty-sixth, Twenty-seventh, K and L streets. The Native Sons were two years in raising \$50,000 to buy the property, which they gave to the State.

MR. MCARTHUR, the inventor of the metallurgical process which bears his name, is expected shortly at Baker City, Oregon, and will superintend the tests of the process to be made at the Eureka and Exelsior mines at Crocker Creek.

Amalgamation at the Comstock Lode.

A Historical Sketch of Milling Operations at Washoe and an Account of the Treatment of Tailings.

NUMBER IV.

[By A. D. Hobbs, Jr. Read before the American Institute of Mining Engineers.]

XI. Treatment of Tailings at the Lyon Mill.

The plant of the Lyon mill was slowly wrought out by experience. The original mill had 30 stamps, 20 Wheeler pans, 10 settlers, and 3 "lavaderos" or washing-tubs. The power was furnished by a 50 foot overshot water-wheel. The pans first used for tailings held 1500 to 1800 pounds to the charge. When the Andrews reservoir was bought, in 1869, 20 Wheeler pans and 10 settlers were added, each pan holding charges of 2500 to 2800 pounds. In 1870 and 1871 very large pans for tailings came into vogue. These were "combination" pans, with iron bottoms and wooden sides. Janin was using McCone pans, which held 2 to 2½ tons of tailings (or 1½ to 1½ tons of pure slime), and Parke was introducing much larger sizes. Influenced by the reports of improved results obtained with the largest pans, the management, in 1872, took out 20 Wheeler pans, substituting two 10-ton pans of the Parke pattern, with 2 large settlers. These pans were 9 or 10 feet in diameter by about 6 feet high, and the settlers were about 12 feet in diameter by 8 feet high. Their use was attended by such a large loss of quicksilver and low yield, that they were soon thrown out, and the mill was run with the remaining 20 Wheeler pans. Finally these last were replaced by 8 combination pans of about three

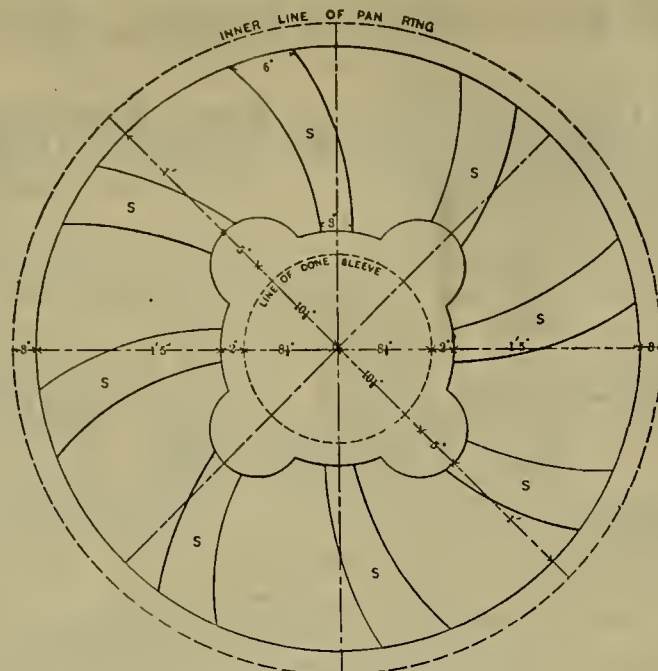
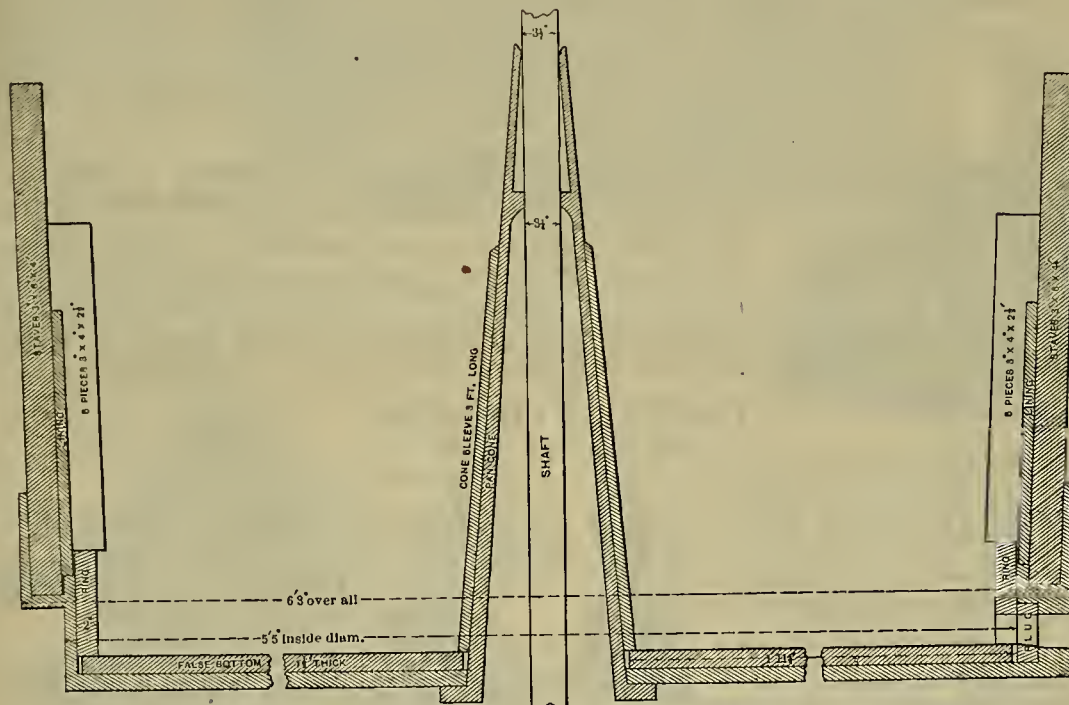
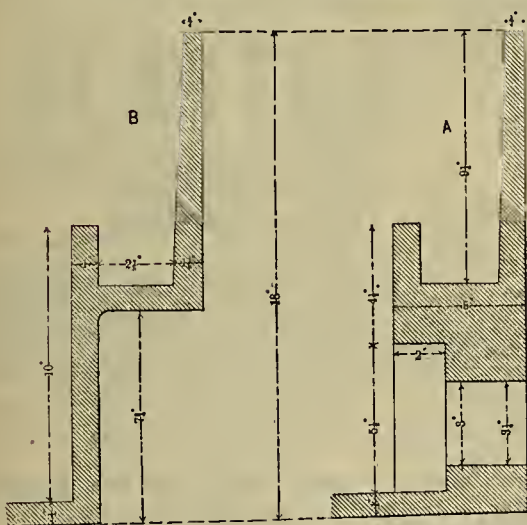


Fig. 4.—BOTTOM OF MULLER.

S, S, Shoes cast in one piece with muller.

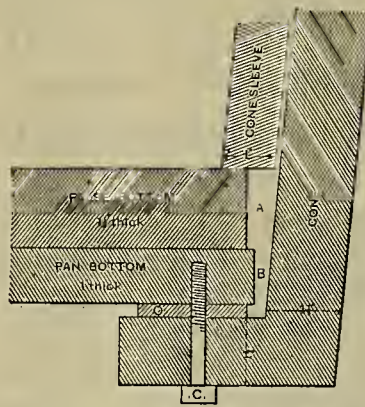


TAILINGS PAN, LYON MILL, DAYTON, NEVADA.



FLANGE OF PAN-BOTTOM

A, Section at discharge hole. B, Section at any other point of circumference.



MODE OF FASTENING CONE TO BOTTOM.

A, Space between false bottom and cone, caulked with pine. B, Space between bottom and cone, caulked with thick red lead and hardwood wedges. C, Eight 3/4-inch bolts. O, Rubber gasket with thick red lead and oil.

tons capacity, for tailings, and 2 somewhat smaller pans for slimes, each pan being provided with a settler. The experience of the Lyon mill indicates strongly that for the material worked there, the best results are to be obtained within the limits of two-ton and three-ton charges.

The perfected arrangement of the mill was as follows:

The mill building was located on a steep side-hill with abundance of fall. The tailings were hauled from the dumps and reservoirs in cars which entered on the upper floor directly over the bins. These cars had sheet-iron hodies

supported on four-wheel trucks, modeled after the ordinary railroad pattern. They held 3300 pounds of pan-tailings, dry weight, and dumped through the bottom of the body and between the rails. The track was of railroad iron, much of it old 65-pound iron rails, bought from the Virginia & Truckee Railroad Company

when this road substituted steel rails. Care was taken to have a solid track and well-constructed rolling-gear, and hence the repairs were only nominal and the expense of handling was light.

The bins held enough to supply the mill for several days. Their spouts discharged directly into the pans.

There were eight pans for treating the tailings caught in the company's reservoirs and locally called "sand," by which term they will be designated hereafter in this paper, and two pans for the slimes, which were all purchased from other mills. The pans were supported on an open framework, admitting light and giving free access to the shafting and gearing below.

There was a settler to each pan. The sand-settlers were 9 feet in diameter by 7 feet high. The slime-settlers were 8 feet in diameter. The settlers discharged over blanket sluices which extended from the mill to the Carson river.

Besides the apparatus named, the mill contained a small boiler for heating the pans with live steam; a Chili mill for grinding copper ore and another for crushing the roasted bullion from the refinery; an extra pan or two for treating sweeps and sulphurets, and a special dissolving tub for making bluestone-solution. All the machinery was run by a Lefel turbine, placed with its axle horizontal, under a 52-foot head.

The construction of the pans is shown in the accompanying sketches, the dimensions given being those of the larger pans. Concerning the details of construction, the following points may be noted:

The height of the flanges of the pan-bottom was gradually increased until it reached the figures given. This prevented all leakage of quicksilver between the staves and the iron—a leakage which occurred, to a greater or less extent, with low flanges, despite all methods of caulking which could be devised.

Iron rings were used to protect the flanges. The greatest wear on the pan was at the discharge-hole, where, in the older construction, the iron was rapidly destroyed until the hole became enlarged to such an extent that it could no longer be plugged securely; and thus the whole bottom was, of necessity, thrown away, although sound in all other respects. By casting the bottom with an outside boss at this place, having a square socket on the inside, 7½ inches wide by 5½ inches high by 2 inches deep, this socket being filled with an oaken plug bored for the discharge-hole, and by using false bottoms, the life of the pan was prolonged for years. An oak plug lasted as long as three false bottoms and rings. A false bottom 1½ inches thick wore out a 2-inch ring and a muller.

The wooden staves forming the pan-sides were protected by a lining of inch-stuff, 2 feet long, nailed on the inside. Instead of wings, five pieces of timber, 3 inches by 4 inches by 2½ feet long, spiked vertically to the sides, were used with satisfactory results.

The muller and shoes were cast in one piece, as shown in Fig. 4. This simple form was adopted after trial of many varieties. By leaving ample spaces, both on the outside and the inside of the muller, with a proper speed, there was no difficulty in securing a good circulation of the pulp.

Besides the usual appendages of retort-house, blacksmith-shop, carpenter-shop, etc., the mill was provided with a bullion-refinery (which has been described in a previous volume of these Transactions), with sulphuric-acid chambers, and with bluestone works. Moreover, at one time there was a borax-factory attached, which was a short-lived affair. This last was in operation in 1872, when the borax excitement raged in California and Nevada. The managers of the company were attacked by the fever, and by their order a couple of dissolving-tubs with crystallizing-vats were put up in the mill. Borate of lime was hauled some 60 miles, in wagons, from Rhode's marsh, near Columbus, Nevada, and treated with carbonate of soda (also hauled a long distance) and steam. The borax produced was of the finest quality. A considerable amount was shipped to England and there sold at the highest market prices. But the price of borax fell from 36 to 8 cents per pound (local quotations); and as the latter sum was insufficient to pay expenses of manufacture at such a point as Dayton, which was far removed from the deposits, the borax department was closed.

The acid factory held two lead chambers, one 15 feet high by 20 feet wide by 45 feet long, the other of the same height and width, but 90 feet long; besides concentrating pans, where acid of 62 degrees B. was made for sale. The two chambers were run, either separately or (by preference when business demands permitted) as a system. They produced chamber acid of 45° to 48° B., and tower acid of 12° to 18° B., the latter article coming from the "bambaroon towers," which were cheap local substitutes for the more expensive Gay-Lussac apparatus. The raw materials used were Japanese or Nevada sulphur and nitre. Owing principally to the uncertain and fluctuating nature of the market, which, for a couple of months, would demand an immediate supply that taxed the extreme capacity of the works, and then suddenly fell off to almost nothing, it was impossible to run the chambers continuously, and therefore to the best advantage. Nevertheless good results were often made, in one instance, in 1877, the chambers producing 2904 pounds of monohydrated acid per 100 pounds of sulphur

(Continued on page 157.)

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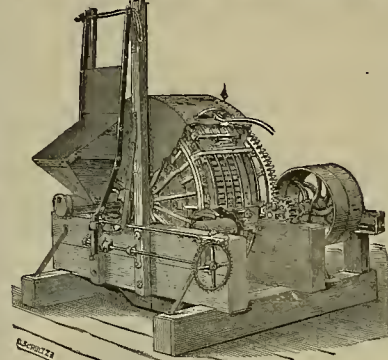
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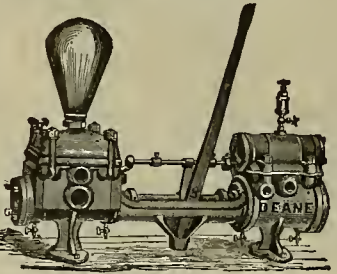
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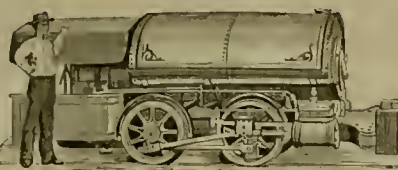
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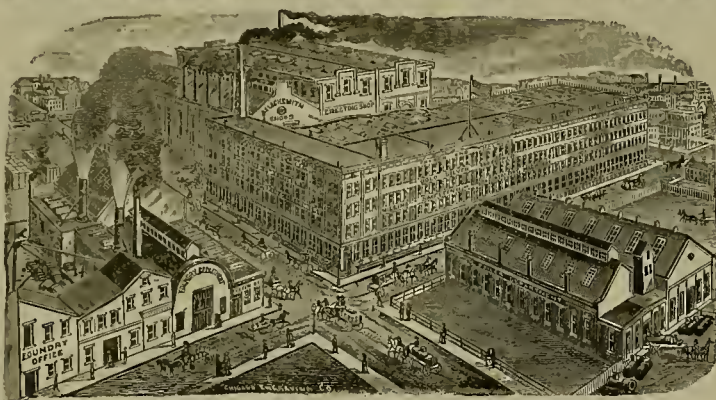
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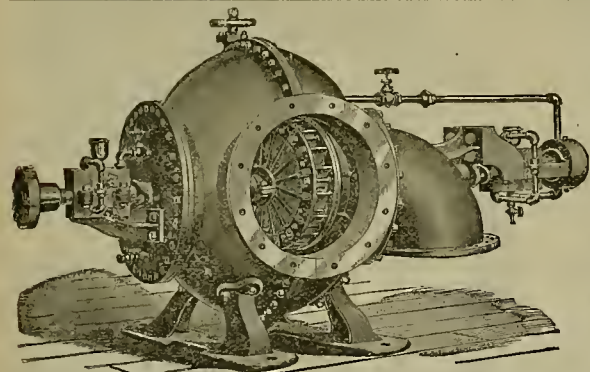
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Engraving Superior Wood and Metal Engraving, Electrotyping and Stereotyping done at the office of this paper.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, March 5, 1891.

Continued rains, causing high waters and had made in the interior, have restricted general trade; but when the spring business opens it is claimed that there will be a large increase in the volume of goods going out on orders. Everything points to a bright future, while a fair deposit of snow on the mountain ranges insures a prosperous mining season. Next week the local money market ought to be better than for some months past. Among ironworkers the same hopeful feeling heretofore noted still manifested regarding future prospects. The decline in coal and iron is in their favor.

MEXICAN DOLLARS—The market is dull but fairly steady at about 78 1/2c.

QUICKSILVER—Receipts the past week aggregate 265 flasks, and exports by sea 35 flasks to Japan. The market is flat at lower prices. Buyers continue to haggle over prices, trying to secure better concessions in all conceivable ways.

SILVER—Department purchases in this month reported as follows:

	Offered ounces.	Purchased ounces.	Price paid per ounce.
March 2.....	7,480,000	105,000	\$ 9250 to \$
March 4.....	745,000	93,600	to \$9750

Now that Congress has adjourned, it would be in the natural order of things to send the silver market at the East to a higher range of values. There is no doubt that strong parties at the East have been quietly buying all the available surplus stock of silver to be had in the home and foreign markets. Several lines of securities abroad, whose market values are based on that of silver, have also been taken comparatively low prices. The output of the mine this country is reported in well-informed quarters to be less than one year ago. The silver situation is largely upon in our editorial department. Three foreign buyers are in the market.

BORAX—Receipts the past week aggregate 77 cwt., and exports by sea 207 cwt. to New York. The local market is steady at full prices. At the East the market is reported strong at slightly higher prices, under a temporary scarcity.

LIME—Receipts the past week show a decided decline off, aggregating only 1775 hhls. Exports by sea were only 50 hhls, and they were sent to Central America. The local demand is light, owing to favorable weather.

LEAD—The market has a steadier tone. It looks as if the market will do better, now that no fear any be entertained of Congress legislating in favor of Mexican ore.

IRON—Imports of pig the past week aggregate follows: New York, 150 tons; England, 500, total, 650 tons. The market is fairly steady around 10 quotations. Continued rains in the valleys and snowfall in the mountains strengthen the conviction that this year will witness a prosperous season among iron works.

TIN—Imports of plate the past week aggregate 805 boxes. The market for both pig and plate is fairly strong, with canners large consumers, English cables report outside holders of plate making concessions to induce buying, but makers being sold ahead, are not in the market as sellers.

COPPER—New York advices report heavy shipments to Europe. These purchases are said to have been made from outside holders. Home consumers are still restricting their buying, which allows the output of the mines to increase. A London telegram to the *Iron Age* says: Copper has undergone very little change, but the market is firmer. Sellers are reserved in their offerings, and speculative interest is rather more active. Higher prices are expected, as there is less American selling, consumers are buying moderately, but there is more inquiry from some quarters.

COKE—Imports the past week aggregate as follows: Newcastle (England), 1616 tons; Swansea, 1600 tons; Greenock, 1903. Total, 3534 tons. The market is barely steady at quotations. From the ship's side in round parcels, our quotations can be shaded from \$2 to \$3 a ton.

COAL—Imports the past week aggregate as follows: New York, 105 tons; Philadelphia, 250; Tacoma, 5900; Swansea, 882; Departure Bay, 2350; Seattle, 1450; Coos Bay, 200; Nanaimo, 3487; Newcastle, N. S. W., 2196; Port Antonio, 2180. Total, 13,345 tons. Continued free imports of coals have retarded further demoralization in the market for coal and near-by cargoes. Large consumers are well supplied, while the yards are filling up. Correct quotations are hard to secure at this writing. Our Puget Sound advices report still heavier deliveries at the water fronts for shipment to San Francisco. These free shipments, when afloat, are not calculated to improve the situation. The weather is still favorable for growing crops, which will undoubtedly cause more deep-sea vessels to come to this port with coal for outward cargoes of wheat.

Eastern Metal Markets.

By Telegraph.

New York, March 5.—The following are the closing prices the past week:

	Silver in Silver	Copper.	Lead.	Tin.
Thursday.....	97	14 25	4 30	19 85
Friday.....	97	14 25	4 30	19 85
Saturday.....	97 1/2	14 25	4 30	19 85
Sunday.....	97 1/2	14 25	4 30	19 85
Monday.....	98	14 25	4 32 1/2	19 85
Tuesday.....	98	14 25	4 35	19 85

Lead has been dull here in New York and considerable has been offered at 4.30c. Holders are afraid of Mexican being admitted by some legislative device or other. It is a bugaboo that keeps them awake at nights. Spelter is being sold at 5@5.10c. Copper has been in better demand at some reduction in price, lake being quoted at 13c. Arizona firm at 13 1/2c, casting brands, 11 1/2@11 3/4c. Very large exports of copper are being made from this country.

LA GRIFFE has attacked many miners in Arizona and Nevada, in some cases reducing the price, so the works had to be temporarily closed down.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING FEB. 24, 1891.

- 447,038.—SHUTTLE MOTION FOR LOOMS—J. W. Babcock, San Diego, Cal.
 446,912.—SET-TRIGGER—O. A. Bremer, S. F.
 447,040.—MUSIC LEAF TURNER—E. W. Burnham, San Diego, Cal.
 446,919.—BLASTING FUSE—D. B. James, S. F.
 446,922.—FIRE-PROOF PAINT—I. F. Merrill, S. F.
 445,876.—MISCELLANEOUS PURIFIER—Miller & Walker, Oregon City, Or.
 447,195.—ANNUNCIATOR—J. E. A. Miller, S. F.
 447,013.—GATE—J. F. Miller, S. F.
 446,926.—TWIN MACHINE—J. W. Perkins, San Jose, Cal.
 447,066.—PERCH FOR BIRO CAGES—J. F. Sweeney, S. F.
 446,899.—METALLIC RAILWAY TIE AND CHAIR—H. P. Sweet, Los Angeles, Cal.
 446,900.—METALLIC ROADBED DRAIN AND SAFETY TIE—H. P. Sweet, Los Angeles, Cal.
 446,957.—ENGINE GOVERNOR—E. Thompson, S. F.
 446,905.—CABLE RAILWAY—Watriss & Kaighin, S. F.
 446,939.—METALLIC LATH MACHINE—J. Weichart, S. F.

The following brief list by telegram, for March 3d, will appear more complete on receipt of mail advices:

California—Charles H. Benoit and A. Pillot, San Jose, window screen; Luther H. Buchanan, Pasadena, assignor of one-half to J. D. Shorh, San Gabriel, electric arc lamp; John A. Buffer, San Francisco, ice-cream freezer. Washington—George W. Ansley and J. H. Boyd, Medical Lake, said Boyd assignor to said Ansley, clothes drier; Robert McMahon, assignor of one-half to Gaston, Seattle, car coupling.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GATE.—John F. A. Millerick, S. F. No. 447,013, Dated Feb. 24, 1891. This invention relates to that class of gates adapted to be opened and closed by the wheels of approaching and receding vehicle running down cranks in the roadway. The invention consists in certain novel constructions and combinations. The object is to provide an effective and readily-operating gate of this class.

PERCH FOR BIRO-CAGES.—John F. Sweeney, S. F. No. 447,066. Dated Feb. 24, 1891. These perches are so arranged as not to extend more than half-way across the cage and are adjustable up or down. By the construction adopted, the perches are easily supported within the cage, and in proper positions with relation to each other, so that the bird can easily fly from one perch to the other without danger of breaking or damaging his feathers, and no perch need be placed over another so as to become soiled and dirty. On that portion of the perch nearest to the side of the cage is fixed, by means of fish-glue, a compound of sharp sand and red pepper. This gives an opportunity for the bird to rub and scratch itself. The pepper acts to keep it clear of vermin, and the sharp sand will wear upon the ends of the toe nails so as to prevent them from becoming too long, which is the great difficulty where birds are confined in cages.

Mining Share Market.

Although the market dragged throughout the past week, yet an undercurrent of strength was perceptible, which looks well for a higher range of values. This journal has been a consistent bull on the market from the time Con. Virginia touched \$2.50 a share, and the writer sees nothing, as yet, to warrant taking a different view of the situation, but perceives many things to justify a continuance in the same course. Since about the middle of last November, the local money market has been close, with more or less feverishness reported; but now the indications point to a healthy, easy market at an early day. During the above time, assessments have followed assessments, with more still to come. This has caused large quantities of shares held by outsiders to be thrown on the market, which were absorbed in a quiet, mysterious manner, but not by other outsiders, who have not been generally encouraged to buy, for they have been frightened by sedulously circulated bear points, and also by doubts thrown upon well-authenticated advices of important improvements in the mines. It is thought that the situation of the mining share market and the condition of the mines warrant still higher prices, which are bound to come before long, but what the manipulations will be in the interim, of course one cannot say.

The share market opened this (Thursday) morning dull and weak. After Call under systematic cross-orders, prices shaded off still more. Outside operators will do well if they enter the market now, for there is undoubtedly quite an up move near at hand.

From the Comstock mines our advices report that they are in rich ore on four levels in Con. Virginia, as they are in the upraise from the 1200-foot level. The battery assays continue to increase in value. In Andes they are running for the ore lying toward the old Burning Moscow ground. It is said to be rich. This, probably, is why manipulators have been buying the shares of the mine.

The work heretofore reported by us as under way in Ophir and other north end mines, is being vigorously pushed with good results expected to follow soon. In Best and Belcher they should report good

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY.	LOCATION.	NO. AMT. LEVIED.	DATE.	PLAC. OF BUSINESS.
Atlantic Con. M. Co.	Nevada.	7.	25. Nov. 19.	330 Pine St.
Belcher M. Co.	Nevada.	41.	50. Feb. 17.	331 Pine St.
Best & Belcher M. Co.	Nevada.	48.	25. Feb. 17.	309 Montgomery St.
California State Co.	California.	6.	30. Feb. 2.	9 Mission St.
Challenge Con. M. Co.	Nevada.	8.	50. Jan. 23.	331 Pine St.
Confidence S. M. Co.	Nevada.	18.	75. Feb. 18.	414 California St.
Contra Estaca Con. Mex. M. Co.	Mexico.	1.	50. Dec. 15.	309 Montgomery St.
Con. St. G. & H. M. Co.	California.	2.	15. Feb. 12.	320 Sansome St.
Cosmopolitan M. Co.	Nevada.	6.	10. Feb. 24.	240 Montgomery St.
Crescent M. & M. Co.	California.	5.	25. Feb. 20.	310 Pine St.
Crown Point S. M. Co.	Nevada.	34.	50. Feb. 19.	331 Pine St.
Crocker M. Co.	Arizona.	10.	10. Feb. 16.	309 Montgomery St.
Gould & Curry M. Co.	Nevada.	66.	30. Feb. 3.	309 Montgomery St.
Gray Eagle M. Co.	California.	22.	3. Feb. 5.	303 California St.
Hale & Norcross M. Co.	Arizona.	5.	10. Jan. 16.	325 California St.
Head Centre & Tranquility M. Co.	Ariz.	2.	5. Jan. 19.	310 Pine St.
Idlewild G. M. Co.	California.	1.	10. Jan. 29.	300 Pine St.
Lady Washington M. Co.	Nevada.	8.	25. Mar. 3.	209 Montgomery St.
Martin White M. Co.	Nevada.	25.	50. Feb. 2.	325 Montgomery St.
Middle Creek M. Co.	British Columbia.	5.	10. Feb. 2.	315 Pine St.
Midas M. Co.	California.	1.	20. Jan. 13.	225 Montgomery St.
North Gould & Curry G. & S. M. Co.	Nevada.	12.	20. Jan. 10.	331 Montgomery St.
Northwestern M. Co.	British Columbia.	2.	7. Feb. 10.	433 California St.
Savage M. Co.	Nevada.	75.	50. Feb. 13.	325 Montgomery St.
Silver King M. Co.	Nevada.	5.	20. Feb. 21.	325 Montgomery St.
Telegraph Drift M. Co.	California.	1.	2. Feb. 10.	Downville
True Cons. M. Co.	California.	10.	21. Dec. 13.	434 California St.
Valley View M. Co.	California.	1.	2. Feb. 9.	306 Pine St.

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING DATE
Chollar M. Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	Annual, Mar. 18
Evening Star M. Co.	California.	J. J. Scoville.	309 Montgomery St.	Annual, Mar. 18
Hale & Norcross M. Co.	Nevada.	A. B. Thompson.	309 Montgomery St.	Annual, Mar. 11
Potosi M. Co.	Nevada.	C. E. Elliott.	309 Montgomery St.	Annual, Mar. 11

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Candelaria Con. M. Co.	New Mexico.	G. Gale.	309 Montgomery St.	25.	Dec. 3
Commonwealth M. Co.	Nevada.	R. R. Grayson.	331 Pine St.	20.	Nov. 20
Champion M. Co.	Nevada.	T. Wetzel.	320 Sansome St.	15.	Feb. 16
Pacific Coast Borax Co.	California.	A. H. Drake.	230 Montgomery St.	1.00.	Mar. 10
Jackson M. Co.	Nevada.	W. R. Drake.	311 Pine St.	10.	Jan. 19

ore before long. Several levels are being opened in Gould and Curry. Now that the refuse and other poor stuff in Savage has been milled, and the stock knocked down under an assessment, it is in order to steadily increase the battery assays. The ore they are milling justifies higher battery assays than \$17, although the latter is an improvement on recent returns. They have a good body of ore, going over \$35 a ton, on the 1300-foot level. In Hale and Norcross a reported rich strike can be looked for at any time after the 10th or 15th of this month. In Chollar, work is under way to develop the ore about the 1200-foot level running toward Potosi. In the latter mine and also in Bullion, work is being done which will cause their shares to have more of a speculative character. It is said that soon after Alpha is assessed, an improvement in that mine, or one near by, will be reported.

Mystery still shrouds the work in Challenge, Confidence and Crown Point, but well-informed miners are very sanguine of a development in one and perhaps in all three of them. The assessments have probably driven in enough stock to justify a strike. Work in the Alta group is being closely watched. In the Bodies, Tuscaroras and Quijotas, the work under way is being closely watched by usually well-informed parties.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, March 5, 1891.

ANTIMONY.....	8 @ 19
BORAX—R. Rind, in cask lots.....	8 @
Powdered.....	8 @
Concentrated.....	7 1/2 @
All grades jobbing at an advance.	
COPPER.....	23 @
Roll.....	23 @
Sheathing.....	23 @
Ingot, jobbing.....	18 @
do, wholesale.....	17 @
Fire Box Sheets.....	2 1/2 @
LEAD—Pig.....	43 @
Bar.....	6 @
Sheet.....	7 1/2 @
Pipe.....	6 @
Shot, discount 10% on 500 bags Drop, 9 bag.....	2 00 @
Chilled, do.....	2 20 @
QUICKSILVER—By the flask.....	46 00 @
Flasks, old.....	10 00 @
CHROMIUM IRON ORE, 1/2 ton.....	16 @
Steel—English, B. & S. 100 lbs.....	7 @
Canton tool.....	9 @
Black Diamond tool.....	9 @
Pick and Hammer.....	8 @
Machinery.....	4 @
Toe Calk.....	4 1/2 @
TINPLATE—B. V. steel grade, 14x20, to arrive.....	6 50 @
B. V. steel grade, 14x20, spot.....	6 37 @
Charcoal, 14x20.....	6 @
do, 20x28.....	13 00 @
Pig tin, spot, 1/2 lb.....	— @ 22
IRON—Bar, base.....	3 @
Norway, base.....	4 @
To Load.....	28 @
IRON—Glengarnock ton.....	31 00 @
Eglington, ton.....	29 @
American Soft, No. 1, ton.....	— @ 30
Oregon Pig, ton.....	30 @
Puget Sound, ton.....	30 @
Clay Lane White.....	26 00 @
Shotts, No. 1.....	32 00 @
Langdon.....	30 00 @
Thorncliffe.....	30 00 @
Garsberrrie.....	30 00 @
Barrow.....	30 00 @
Carbolite.....	30 00 @

Coal and Coke.

SPOT FROM YARD—PER TON.	TO LOAD—PER TON.
Wellington.....	\$10 00 Australian.....
Greta.....	8 50@ Liverpool.....
Carbon Hill.....	8 00@ Scotch Splint.....
Napaimo.....	10 00@ Cardiff.....
Gilmour.....	8 00@ Lehigh Lump.....
Seattle.....	8 00@ Cumberland bk 13 50@
Coos Bay.....	7 00@ Egg, hard.....
Cannel.....	10 00@
Egg, hard.....	16 00@
Cumberland, in sacks 16 00@	
do, bulk.....	14 00@
Walsend.....	9 00@
Scotch Splint.....	10 00@ To load.....
Brymbo.....	9 50@ Spot, in bulk.....

COMSTOCK TUNNEL.—The following Comstock mining companies have paid off their indebtedness to the Comstock Tunnel Company under the terms of the recent contract: Con. Cal. and Virginia \$137,000. Hale and Norcross \$38,810. Crown Point \$32,719. Overman \$8015. Belcher \$4715. Confidence \$1040. Challenge Con. \$876, and Con Imperial \$796. The Chollar and Savage companies will, in all probability, settle their accounts within the next few days.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Feb. 12.	WEEK ENDING Feb. 19.	WEEK ENDING Feb. 26.	WEEK ENDING Mar. 5.
Alpha.....	70	90	60	80
Alta.....	60	85	60	80
Andes.....	95	120	100	140
Belcher.....	145	190	130	140
Best & Belcher.....	230	320	235	310
Bullion.....	130	140	130	210
Bottle Creek.....	35	47	30	210
Bulwer.....	45	45	50	60
Commonwealth.....	80	75	75	75
Con. Va. & Cal.....	425	525	450	637
Challenge.....	135	175	130	210
Chollar.....	135	235	195	210
Confidence.....	500	560	400	425
Con. Imperial.....	20	25	15	20
Caledonia.....	60	70	55	60
Crown Point.....	170	205	180	150
Crocker.....	15	10	10	15
Del Monte.....	30	30	30	25
Eureka Con.....	30	30	30	25
Excelsior.....	65	85	60	75
Grand.....	20	20	20	20
Gould & Curry.....	200	300	230	215
Hale & Norcross.....	150	205	195	210
Julia.....	30	25	15	20
Justico.....	90	120	100	85
Kentuck.....	40	45	40	40
Lady Wash.....	20	20	25	15
Mono.....	60	85	65	75
Mexican.....	235	230	235	275
Nevada.....	20	25	25	25
North Belle Isle.....	50	40	50	55
Nev. Queen.....	25	30	25	20
Occidental.....	75	105	85	90
Ophir.....	310	390	235	375
Overman.....	135	175	130	185
Potosi.....	430	525	450	480
Peerless.....	15	10	15	10
Peer.....	10	10	10	10
Savage.....	175	225	215	210
Sierra Nevada.....	215	240	210	215
Silver Hill.....	20	25	20	20
Scorpion.....	15	20	15	10
Union Con.....	215	240	235	240
Yellow Jacket.....	225	275	210	215

Sales at San Francisco Stock Exchange.

THURSDAY, March 5, 9:30 A. M.	
100 Alpha Con.....	65c
200 Alta.....	65c
1200 Andes.....	1.25
100 Belcher.....	1.35
25 Belle Isle.....	60c
470 Best & Belcher.....	2.50
500 Bodie.....	1.10
200 Bullion.....	2.05
500 Chollar.....	1.80
200 Chollar.....	2.00
150 Commonwealth.....	75c
550 Con Cal & V.....	6.25
200 Con Imperial.....	15c
200 Con Pacific.....	1.00
100 Crown Point.....	1.30
130 Excelsior.....	65c

The Pacific Cattle bill was not passed by Congress.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on this Coast now for so many years, the firm's name is a well-known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the

Amalgamation at the Comstock Lode.

(Continued from page 153.)

consumed. As the maximum theoretical production is 306½ pounds of monohydrate for this amount of sulphur, the loss was only 5.1 per cent.

A large part of the chamber acid was concentrated in lead pans to 62° B. and sold. The rest, except small quantities sold to mills, was used without concentration in the bluestone works. The weak tower acid was utilized in making copper-sulphate solution for the mill.

The raw material for the bluestone factory consisted of copper ore, principally carbonates from Walker river, copper matte and precipitate from California, and base hullion. The bluestone made from the hullion was of the highest grade and equal to the best English imported. The product of the factory was sold to amalgamating mills principally; some went to California for the use of the farmers. During several years there was a branch establishment at Carson, which utilized the copper-sulphate solution from the mint refinery.

The Lyon mill used only the refuse from the factory, that is, the scrapings and portions which did not look well enough to be put on the market, or the mother liquor which was too weak for profitable concentration. Usually it employed uncrystallized sulphate of copper made from ore in a special tub. In either case, the copper sulphate held an appreciable amount of iron sulphate, and, at times, an excess of acid designedly introduced.

Sulphate of iron was manufactured in small amounts to satisfy a local demand.

The tailings worked at the mill from 1873 to 1877 inclusive were for the most part of very low grade. They were classified under the local designations of "sulphurets," "slimes" and "sand."

The sulphurets were obtained by purchase from the blanket sluices so extensively used at the Comstock. They were principally iron sulphurets. Those caught near the mills which crushed the ores whence they were derived, oxidized with comparative facility on exposure to the air, and yielded by amalgamation as much as 80 per cent of their contents of precious metal. Those caught at greater distances from the quartz-mills showed no signs of oxidation even after long exposure, and it appeared impossible to extract from them by pan-amalgamation more than 50 per cent of their assay values. The reason for this difference in behavior was not known positively. Sulphurets were obtained only in small amounts, were usually amalgamated by themselves, and made no figure in the production of the mill.

The slimes, during the years mentioned, were all purchased from the stamp-mills whenever these had any to sell. The silver contained in them existed apparently in part as a simple sulphuret (such as argentite), and in much larger measure as a multiple sulphuret (such as stephanite or polybasite). Their chemical composition varied materially. Their chief constituent, clay, was the main cause of the difficulty in treating them.

The slimes were spread out on the ground, all lumps being broken up and allowed to dry thoroughly before being worked. Long experience proved beyond question that this preparatory drying was essential for good amalgamation. In common parlance, the slimes were "oxidized," but the change effected was mechanical rather than chemical.

At Dayton, two pans were reserved for treating this material, which was mixed in the pan with certain amounts of sand. The usual charge was composed of 60 to 65 per cent of slime and 40 to 35 per cent of sand. The sand seemed to act beneficially by cutting up any lumps of slime which might exist, and by clearing the globules of quicksilver from any adhering slimy envelope which, unless removed, would keep the quicksilver from contact with the precious metals, prevent the globules from uniting, and carry them off in the stream of tailings.

The slimes purchased by the mill varied greatly in value, ranging from \$13 to \$30 per ton, with occasional higher values. The slime charges (slime and sand mixed) during the years 1875 to 1877 averaged from \$13 to \$18 per ton.

(To be Continued.)

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

BACK FILES OF THE MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$5. Inserted in Dewey's patent binder, 50 cents additional per volume.

Our Agents.

OUR FAIRNESS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

GEO. WILSON—Sacramento Co.
J. C. HOAG—San Francisco.
F. W. KNAPP—Amador Co.
OSCAR EVANS—Santa Clara Co.
MR. M. E. DUBLETT—Ventura Co.
W. L. WANDER—Sutter and Yuba Cos.
ANDREW RAIN—Monterey Co.
M. S. PAINES—Alameda and Contra Costa Cos.
S. S. SAUL—San Joaquin Co.
B. F. BELT—Shasta Co.
E. H. SCHAEFFLE—Calaveras and Tuolumne Cos.
A. S. COOLBY—Tehama Co.
H. C. HANCKLER—Capay Valley.
SAMUEL CLIFF—Creston, Cal.
JOHN SIMPSON—Oregon.
WM. M. HILLARY—Oregon.
WM. HOLDRA—Oregon.
WM. CLISON—Washington.

Assessment Notices.

GRAY EAGLE MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Placer County, California. Notice is hereby given that a meeting of the Board of Directors, held on the 4th day of February, 1891, an assessment, No. 22, of Three (3) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 9th day of March, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 30th day of March, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
A. W. BARROWS, Secretary pro tem.
Office, Room 11, No. 303 California Street, San Francisco, California.

CRESCENT MILL & MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Crescent Mill, Plumas County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on Friday, the 20th day of February, 1891, an assessment (No. 5) of Twenty-five cents (25c) per share was levied upon the Capital Stock of the Corporation, payable immediately in United States gold coin to the Secretary, at the office of the Company, No. 310 Pine Street, Room 40, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of April, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 4th day of May, 1891, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. H. ISHAM, Secretary.
Office, No. 310 Pine Street, Room 40, San Francisco, California.

UNION IRON WORKS, SACRAMENTO, CAL.

ROOT, NEILSON & CO.,

MANUFACTURERS OF

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MACHINE WORKS,

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and all kinds of MACHINERY.



DEEP WELL PUMPS

DIVIDEND NOTICE.

OFFICE OF THE PACIFIC COAST

Borax Company, San Francisco, February 23, 1891.

At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 3) of One Dollar (\$1.00) per share was declared, payable TUESDAY, March 10, 1891, at the office of the Company, No. 230 Montgomery Street, Rooms 11 and 12. Transfer books close March 5, 1891, at 3 o'clock P. M.

ALTON H. CLOUGH, Secretary.

DIAMOND DRILLS

THE PACIFIC PROSPECTING CO. will contract to prospect with Diamond Core Drill for minerals, etc., or to bore holes for ventilation or drainage. Agents for Diamond Drills, Rock Drills, Mining Machinery and Supplies of all kinds. Diamonds on hand. Inquiries and orders promptly attended to. 213 Sansons Street, San Francisco, Cal.

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ALL SIZES.

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Iron cut, punched and formed, for making pipe on ground. All kinds of Tools supplied for making Pipe. Estimates given. Are prepared for coating all sizes of Pipe with a composition of Coal Tar and Asphaltum.

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Ships under advances to smelting works in Boston New York, Baltimore and Liverpool. Twenty-one years' experience in Shipping Ores and Managing Mines. Solicits consignments of Copper Produce and Management of Mining Matters. All business conducted on Cash Basis. Purchase and shipment of Mining Supplies a SPECIALTY. Sales of Developed Copper Mines undertaken. Business Manager of UNION COPPER MINE, Copperopolis, Cal.; NEWTON COPPER MINE, Amador Co., Cal.

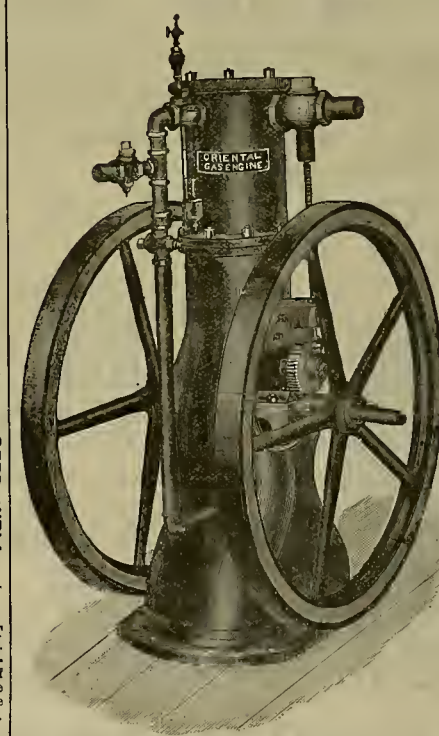
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USES EITHER CITY GAS OR GASOLINE,

At a cost of 25 to 30 cents per day per horse power.

UNEXCELLED FOR FARM USE for

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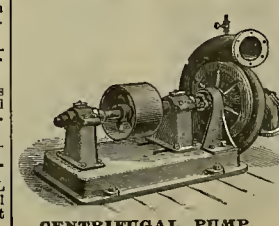
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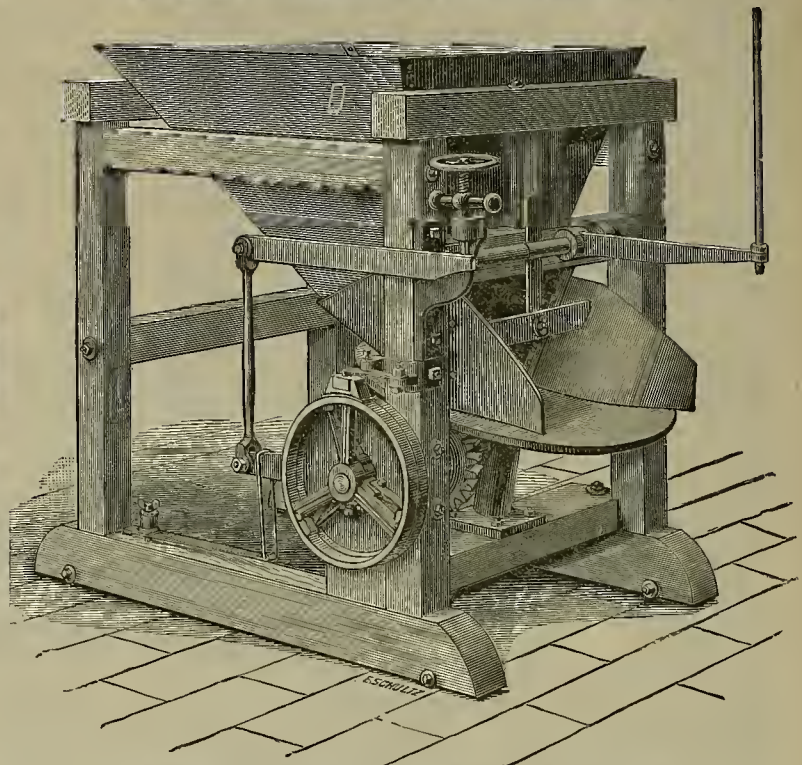
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Nos. 39 to 51 FREMONT STREET, SAN FRANCISCO, CAL.



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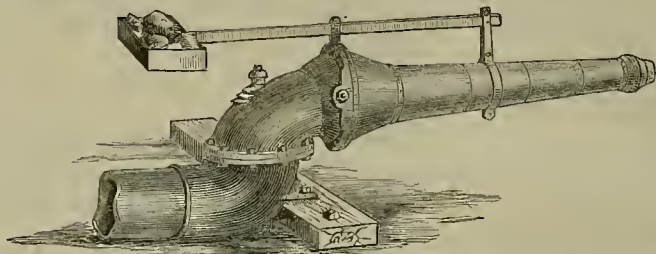
The best form of Feeder ever devised, and pronounced by reputable mining men to be far superior to any form of "Roller" Feeder manufactured. We refer to the following gentlemen who have furnished us with testimonial letters to the above effect, which can be seen at our office, viz.:

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And will furnish descriptive Catalogues and quote prices upon application.

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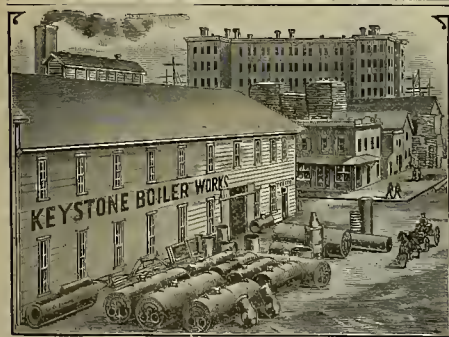
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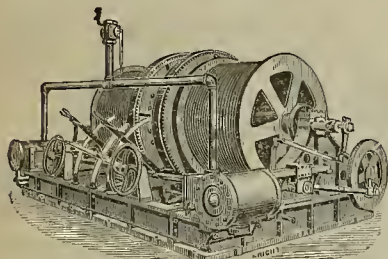
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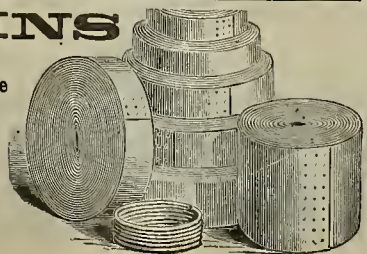
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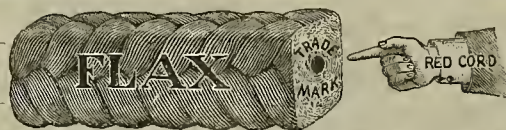


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SQUARE FLAX PACKING.

MANUFACTURED FROM STRICTLY FIRST-CLASS FLAX AND PURE LUBRICANTS. HAS NO SUPERIOR for all Hydraulic Work.

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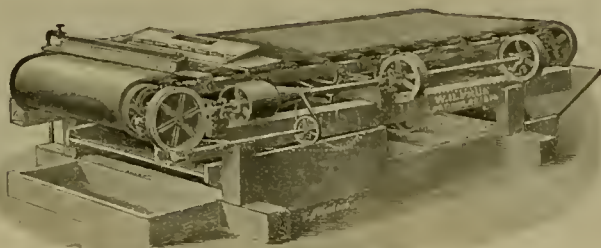
IMPROVED BELT FRUE ORE CONCENTRATOR.

The Best Ore Concentrator in the market, having double the Capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, crushing 350 tons per day, and is giving entire satisfaction as against 48 plain Belt Machines, taking the Pulp from the other 120 Stamps.

Price of Improved Belt Frue Vanner, \$825, f. o. b.
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For Pamphlets, Testimonials and further information apply at office.

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Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), London, October 8, 1885.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

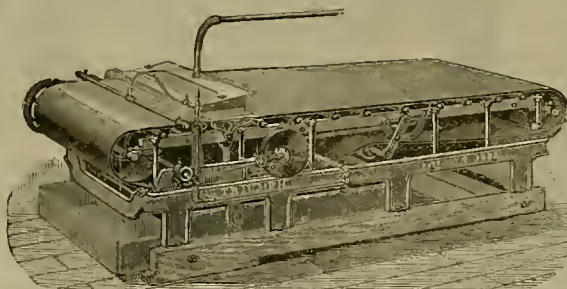
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
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We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if used be. Circulars and testimonial letters furnished on application.



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(PATENTED.)
Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
GRASS VALLEY, NEVADA CO., CAL., NOV. 10, 1885.
Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices. (Signed) Supt North Star and Original Empire Mining Co. N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.



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IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER
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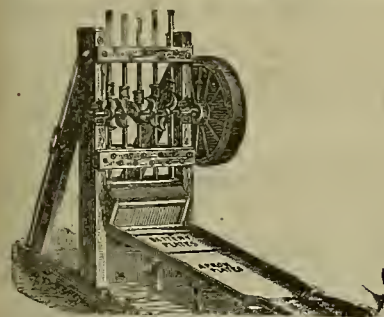
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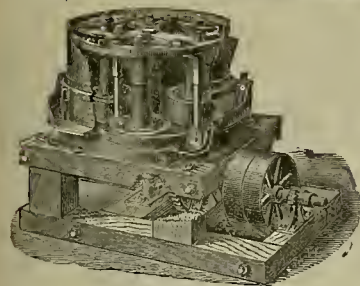
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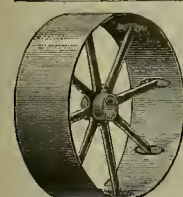
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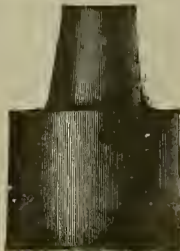
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These SHOES and DIES are in extensive use in all the mining States and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited, subject to above conditions.
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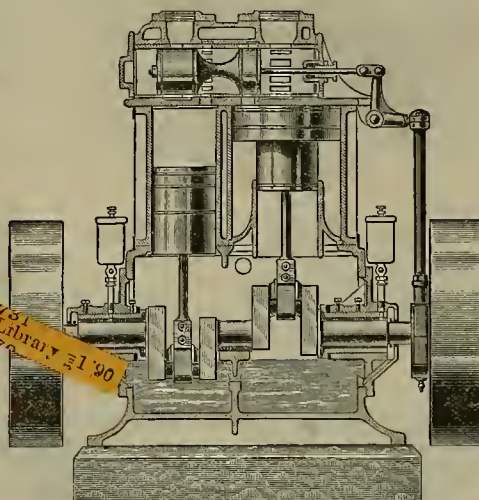
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GREATEST CAPACITY OF ANY CONCENTRATOR MADE,

One Machine Taking Pulp from 10 Stamps.



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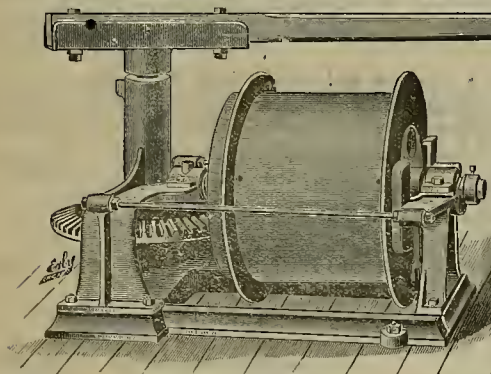
JUNIOR, 166 ENGINES, 4260 HORSE POWER.

Grand Total, 309 Engines. Aggregating 13,975 Horse Power.

21 and 23 Fremont St., San Francisco, Cal.

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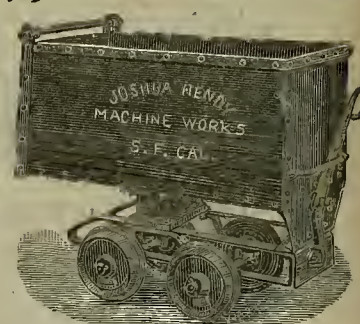
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The hoisting drum is completely under the control of the person in charge of the hoisting or lowering through the shaft of the mine. As the drum is entirely independent from the driving gears, the operations of hoisting, dumping bucket and lowering can be performed with the horse in constant motion, a feature not possessed by any other horse hoist in the market, and one that greatly increases their capacity by avoiding the loss of time due to stopping and starting the horse. They are very light and compact, and can be packed for transportation by mules. Their cost of erection is very slight, two men, in half a day, being able to put one in place, ready for work. With each Whim, working drawings are furnished, showing in detail the proper construction of Gallows Frame and foundation for Hoisting Whim. We carry in stock the following sizes:

- No. 1.—Capacity with One Horse and Single Line, 800 pounds, 75 Feet per Minute.
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Weight of machine, 1200 pounds. Total shipping weight, including Sweep, Levers and Sheaves, 1400 pounds.



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JOSHUA HENDY MACHINE WORKS,

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L. C. MARSHUTZ

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NATIONAL IRON WORKS

N. W. Corner Main and Howard Sts., San Francisco,

—MANUFACTURERS OF—

Stationary and Compound Engines, Flour, Sugar, Saw and Quartz Mill Machinery.

AMALGAMATING MACHINES. CASTINGS AND FORGINGS Of Every Description

ALL WORK TESTED AND GUARANTEED.

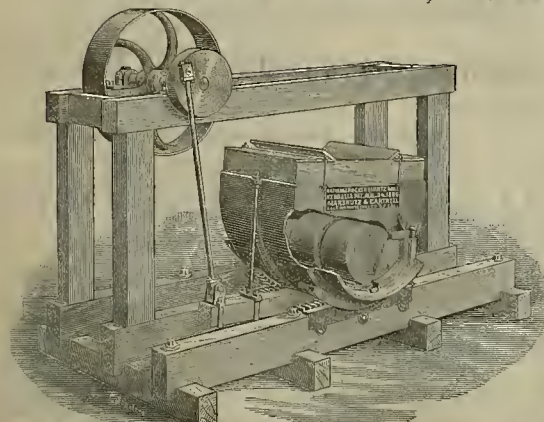
IMPROVED PORTABLE HOISTING ENGINES.

NATIONAL ROCKER QUARTZ MILL.

KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY, 12 Tons in 24 Hours. 3 H. P.

MARSHUTZ & CANTRELL, Sole Manufacturers.



The Patentee and Manufacturers cordially invite miners to critically examine and pass judgment upon this improved system of milling and amalgamating ores in the following particulars:

1. The cost is less than one-half of stamps of same capacity.
2. The freight to mine is less than one-half of stamps.
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4. The power to drive it is less than one-half of stamps.
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6. There is no wear except on shoes and dies.
7. In point of amalgamation it is superior to any other machine in use.
8. In its simplicity of construction.

We challenge competition with Stamps, Ball Pulverizers or any other ore crushing machines now before the public.

MARSHUTZ & CANTRELL.

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THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safe in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXII.—Number 11.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, MARCH 14, 1891.

Three Dollars per Annum
— SINGLE COPIES, 10 CENTS.

Smelter and Smelting Plant.

We herewith present engravings of the "Pacific" water-jacket smelter for argentiferous lead ore and a complete smelting plant. When it is necessary to reduce the ore at the mine, instead of sending it to another works, a plant of from five to 30 tons daily capacity can be built on the plan shown. One of the "Pacific" water-jacket smelters is shown in full running order, the blast for which is furnished by a Baker blower, driven separately by a small engine. This is for the purpose of securing a steady and uniform blast.

The crusher used is of sufficient capacity to crush in a few hours all the ore and flux required for the entire day. It is also driven by a separate engine, making it entirely independent of the other machinery. The two engines are designed specially for the work. The boiler is of the horizontal tubular type, of ample size to furnish steam for the engines and pumps, and is fitted complete with all accessories.

The Pacific smelter, as now constructed, embodies the results of more than 20 years' experience, observation and study as to the requirements of this method of treating ores. The remarkable results obtained from it regarding capacity, for continuous work, minimum cost of repairs and economic production of bullion, fairly entitle it to be considered as the most improved type of smelter now made.

The water-jacket is made of wrought iron in two or four sections, according to size, so that any of them can be removed without disturbance to the rest of the furnace, making all parts accessible for cleaning out and repairs when necessary. The whole structure is made complete at the shop—constructed mostly of wrought iron, to insure strength and lightness, and in sections, to facilitate transportation and setting up; no brickwork being required except

for crucible and two courses on top of jacket, making the cost of erection less than half that of any other style of smelters.

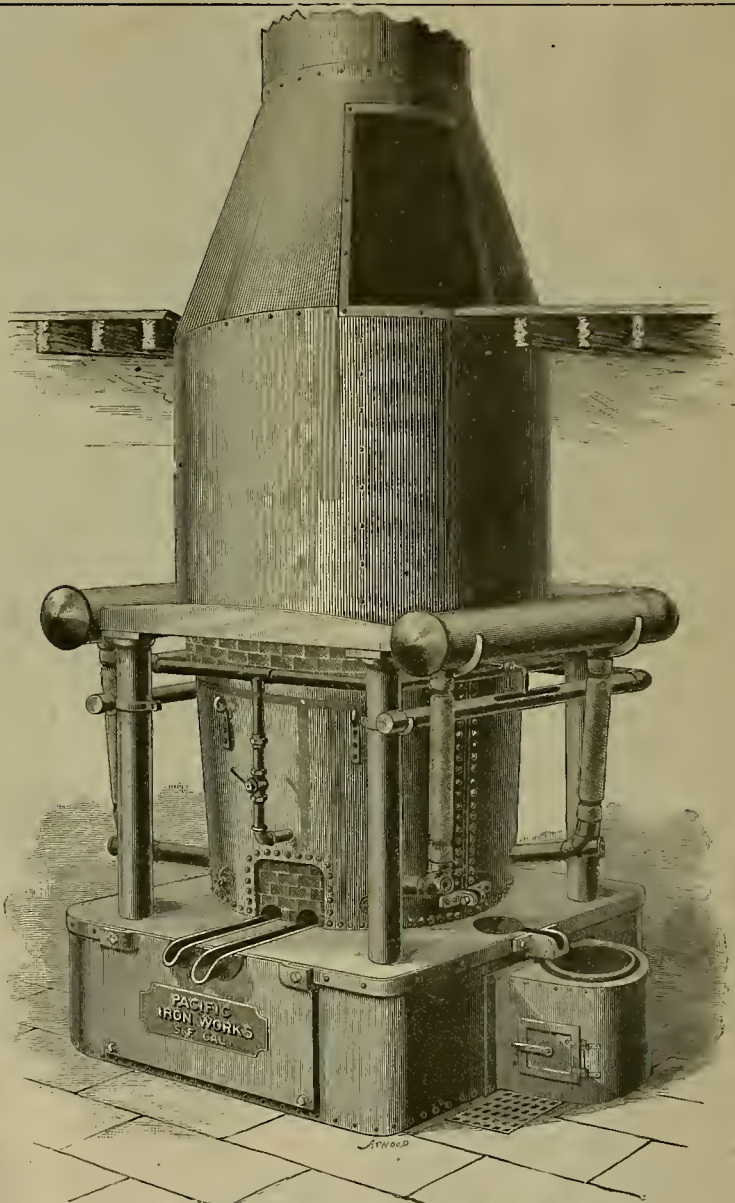
A holler-iron foundation and curb are provided, inside of which the whole structure is built. This is to prevent any escape of bullion in case of leakage from the crucible, which often occurs, involving serious loss without any means of detecting it.

The lead well is located outside the jacket, into which the metal is run and kept hot by a small fire, while the dross and other impurities can be skimmed off before being ladled into molds. The tuyeres are made in the jacket, and, being surrounded by water in active circulation, never burn out. The jackets are oval in form with round ends, giving no corners for the accumulation of slag, which tend to bridge the ore and prevent it from coming in contact with the blast.

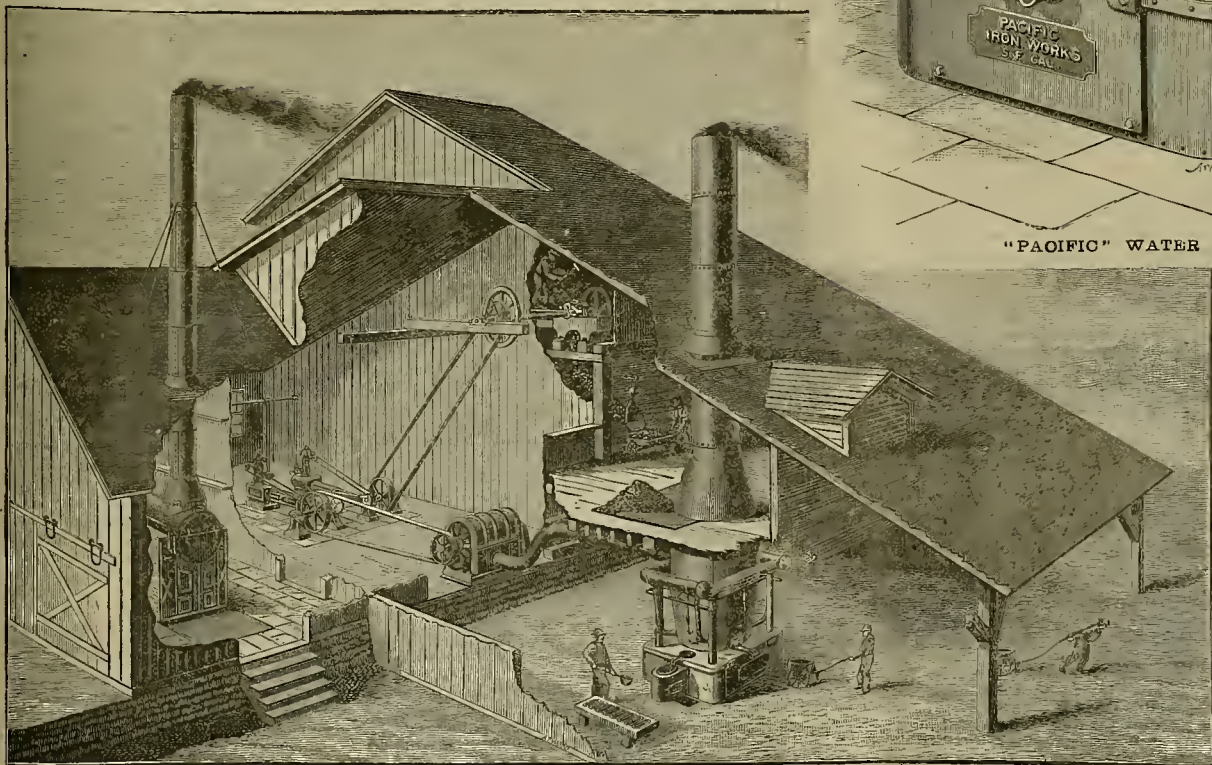
The arrangement of the tuyeres and the distribution of the blast are such as to avoid dead centers, secure perfect combustion and the most economical results from fuel. In the larger sizes both ends are provided with charging doors and slag discharges.

It is a matter of record that these furnaces almost invariably overrun their rated capacity, a result due largely to the perfect distribution and application of the blast. These smelters are made of 10, 20, 30 and 40 tons capacity, the larger sizes being recommended as the most desirable where the ore supply will warrant, as they can be run more economically both as regards fuel and attendance than the smaller. Duplicating the 40-ton stack is recommended when larger capacity is wanted.

In the larger plants separate engines are provided for blower and crusher to insure a steady blast, and for the purpose of being able to vary the speed as occasion may require. Wrought-iron downcasts or fine dust chambers furnished



"PACIFIC" WATER JACKET SMELTER.



COMPLETE SMELTING PLANT FOR ARGENTIFEROUS LEAD ORE.

when desired. The great drawback to the successful treatment of ores by the smelting process, it is well known, has been the want of a smelter that could be run continuously without stopping frequently for repairs. This smelter herewith presented, with the care ordinarily given a steam boiler, can be run as long and with as little loss of time or expense for repair. The Pacific Iron Works of this city have built a large number of these furnaces and complete plants and are prepared to furnish them erected in complete running order in any part of the country.

The Potosi Mining Company has re-elected the following Board of Directors and officers: A. K. P. Harmon, W. E. Sell, Charles T. Bridge, A. W. Rose, Jr. and Joseph Marks. A. K. P. Harmon was re-elected president, W. E. Sell vice-president, Charles E. Elliott secretary, and A. C. Hamilton superintendent.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

Inventors and Inventions.

A Coming Celebration of the American Patent System.

EDITORS PRESS:—The completion of the first century of the American patent system marks so important an epoch in the history of the nation that it is eminently proper that the beginning of the second shall not pass unnoticed.

The centennial anniversaries of other important national events have been celebrated in a manner worthy of a people proud of their country and its growth. Surely the system that has aided the agriculturist in the field, the mechanic in the shop, and the toiler in the mine, that has stimulated invention and helped every branch of modern industry, has played no small part in a history so full of the triumphs of human achievement.

Believing that the American inventor and manufacturer of inventions will regard it a privilege as well as a duty to co-operate in making due recognition of these facts, it is proposed to hold a celebration at the National Capital in April, 1891, which shall in a fitting manner commemorate the important event, and place on record the nation's appreciation of the labors of those whose ingenuity, patience and tireless efforts have exercised such a potent influence in accelerating the prosperous growth of the nation, and in aiding the progress of our civilization.

The necessity for a National Association of Inventors organized for mutual benefit has been frequently discussed in the technical and other journals. No time could be more opportune for the formation of such an association than when men from every part of the country meet to celebrate so important an anniversary. Surely the occasion is most inspiring.

This announcement by the secretary, Mr. J. Elfreth Watkins, of the Central Committee, is a clear index of what is to be expected on this occasion.

The Central Committee is composed of Messrs. John W. Babson, Robt. W. Fenwick, B. H. Warner, Prof. Otis T. Mason, M. M. Parker, Hon. John Lynch, M. C. Stone and J. Elfreth Watkins, representing the most prominent business interests in Washington. This committee has the earnest co-operation of Senators Platt and Teller, Representatives Butterworth and other members of the Congressional Patent Committee, and Hon. C. E. Mitchell, Commissioner of Patents, Dr. G. Brown Goode, Curator at the National Museum, Hon. A. R. Spofford, Congressional Librarian, and many other of the officials of the governmental departments.

Commodious rooms for the meetings of the various committees with telephone service have been provided, and clerks are happily engaged ending out communications to inventors, manufacturers and members of Congress with the view of obtaining information as to the most suitable men to be appointed from the different States of the Union as delegates or representatives to the centennial celebration.

The responses are indicative of great interest being manifested by leading inventors of the country, as well as manufacturers of patented articles. Among the many letters of approval received by the committee is one from Mr. Thomas A. Edison, the great electrical inventor, saying: "I am in hearty sympathy with the movement." Prof. Alex. Graham Bell, inventor and patentee of the telephone, has signified his willingness to preside at one of the meetings of the centennial celebration. The President of the United States will preside at the opening exercises; Hon. John W. Noble, Secretary of the Interior; Hon. Frederick Fraley, LL.D., and Prof. S. P. Langley, LL.D., will also preside at different meetings.

The Committee on Literature, consisting of Dr. G. Brown Goode, chairman; Hon. A. R. Spofford, and L. Deane, Esq., have arranged the following order of exercises, which would be very difficult to excel, and which will prove one of the greatest literary treats of the nineteenth century:

First Public Meeting, Afternoon, April 8, 1891.—To be presided over by the President of the United States.

Second Public Meeting, April 8th 7 to 8:30 P. M. To be presided over by Hon. J. B. Noble, Secretary of the Interior.

Special Reception to Inventors and Manufacturers, and the ladies who accompany them, at the Patent Office, April 8th, 9 to 11:30 P. M., by Hon. John W. Noble, Secretary of the Interior, and Hon. C. E. Mitchell, Commissioner of Patents.

Third Public Meeting, Afternoon, April 9.—To be presided over by Hon. Frederick Fraley, LL.D., President of the National Board of Trade and the American Philosophical Society, and Charter Member of Franklin Institute.

Fourth Public Meeting, Evening, April 9.—To be presided over by Prof. S. P. Langley, LL.D., Secretary of the Smithsonian Institution.

Anniversary Day, April 10.—Anniversary of the signing of the first American Patent Law—An Act to promote the progress of the Useful Arts; by George Washington.

To A. M.—Excursion to Mount Vernon, where an address will be delivered by J. M. Toner, M. D., of Washington, upon "Washington as an Inventor and Promoter of Improvements."

Fifth Public Meeting, April 10.—To be presided over by Prof. A. Graham Bell.

Addresses upon the following subjects are promised at the public meetings:

Edward Atkinson, Ph. D., LL.D., of Massachusetts: Invention in its Effects upon Household Economy.

Dr. John S. Billings, Curator U. S. Army Medical Museum: American Inventions and Discoveries in Medical Surgery and Practical Sanitation.

Hon. Samuel Blatchford, Justice of the Supreme Court of the U. S.—A Century of Patent Law.

Cyrus F. Brackett, M. D., LL.D., of New Jersey, Henry Professor of Physics, College of New Jersey, Princeton: The Effect of Invention Upon the Progress of Electrical Science.

Hon. Benj. Butterworth, Ohio, U. S. House of Representatives: The Effect of our Patent System on the Material Development of the United States.

Octave Chanute of Illinois, President of the American Society of Civil Engineers: The Effect of Inventions upon the Railroad and Other Means of Intercommunication.

Prof. F. W. Clarke, S. B., of Ohio, Chief Chemist, Geological Survey: The Relation of Abstract Scientific Research to Practical Invention, with Special Reference to Chemistry and Physics.

Hon. John W. Daniel of Virginia, U. S. Senator: The New South as an Outgrowth of Invention and the American Patent Law.

Maj. C. E. Dutton, Ordnance Dept., U. S. A.: The Influence of Invention upon the Implements and Munitions of Modern Warfare.

Thomas Gray, C. E. B. Sc., F. R. S. E., of Indiana, Professor of Dynamic Engineering, Rose Polytechnic Institution, Terre Haute: The Invention of the Telegraph and Telephone.

Prof. Otis T. Mason, Ph.D., of Virginia, Curator U. S. National Museum: The Birth of Invention.

Hon. C. E. Mitchell of Connecticut, Commissioner of Patents: The Birth and Growth of the American Patent System.

Hon. O. H. Platt of Connecticut, U. S. Senator: Invention and Advancement.

Col. F. A. Seely of Pennsylvania, Principal Examiner, U. S. Patent Office: International Protection of Industrial Property.

Hon. A. R. Spofford, LL.D., Librarian U. S. Congress: The Copyright System of the United States; its Origin and Growth.

Hon. Robert S. Taylor of Indiana: The Epoch-Making Inventions of America.

Robt. H. Thurston, A. M., LL.D., Doc. Eng., of New York, Director and Professor of Mechanical Engineering, Sibley College, Cornell University: The Invention of the Steam Engine.

W. P. Trowbridge, Ph. D., LL.D., of New York, Professor of Engineering School of Mines, Columbia College: The Effect of Technological Schools upon the Progress of Inventions.

Hon. Edwin Willis, of Michigan, Assistant Secretary of Agriculture: The Relation of Invention to Agriculture.

Hon. Carroll D. Wright, M. A., of Washington, Commissioner of Labor: The Relation of Invention to Labor.

Committees on Reception, Public Comfort, Transportation and Finances have been appointed and are actively engaged making reasonable terms with hotels, private boarding-houses and railroad companies, and arranging for a right royal reception to visitors, and in obtaining contributions from the citizens of Washington and the country at large to defray the expenses attending the renting of committee-rooms, public halls and the printing and circulation of information throughout the United States, but more especially are these funds solicited for the publication of two or more handsomely printed volumes of 500 pages each, which shall contain the addresses delivered by the eminent statesmen, political economists and scientists, together with a series of biographies of the greatest American inventors and manufacturers of their inventions. The treasurer of the Finance Committee is Hon. A. T. Britton, President of the American Security and Trust Co.; Chairman of the Reception Committee is W. Oranah McIntyre; Chairman of the Committee on Public Comfort, W. C. Dodge, with sub-committees on Hotels, J. H. Whitaker, Chairman; and on Private Boarding-Houses, E. T. Fenwick, Chairman.

It is hoped that inventors and manufacturers in your section will take a deep interest in the promotion of the celebration of this important event of our country's history.

Washington, D. C. EDWARD T. FENWICK

Washington Mines.

EDITORS PRESS:—After nearly a year's observation and scientific investigation in this State, I am glad to say our mineral resources are immense. Washington is the coming mining region. Not only do I find gold, silver, copper, lead and iron in good paying quantities, but platinum as well. The latter metal is worth at present \$25 per ounce. On a tributary of the Snoqualmie river—ranging river—I find good platinum prospects. It is associated with the placer gold, and occurs in grains and small nuggets. Like the gold, it is more or less water-worn.

We may expect a great variety of metallic products in this State, owing to the diversified geological structure and composition of the mountains. In the Cascade I find, geologically, a fair representation of all the great ranges in the world—igneous or eruptive rocks, metamorphic rocks and sedimentary formations *ad infinitum*.

Through these varied mountain structures, accompanied with various degrees of metamorphism, it is to be expected that a multifarious collection of minerals and metals exist, and so they are found.

The Cascade of Washington, like the Sierras of California, form the depository of practically inexhaustible stores of mineral wealth. For centuries to come man will break treasures from these mountains that, thanks to nature, are replete for his use and progress.

The dense, almost dismal forests of feathery-

topped evergreens lend an enchantment to the student of nature as he traverses o'er the broad fields of unprospected lands.

Almost daily are new discoveries being made that are significant of vast possibilities.

It seems strange, indeed, that so many men rush off to Alaska and the frozen regions north, in search of gold and silver, when just as good a field exists nearer at home. Taking into account the climatic conditions of this State, its mild, temperate winters, surely it will be a veritable El Dorado as developments proceed and more discoveries are made. Already a large number of good ledges have been located and work commenced that will be followed to the deep. To be brief, we are delighted with the Evergreen State and propose to stay with the country.

CHAS. F. BLACKBURN.

Mountain View Wash.

It Is Now Law.

Following is the full text of the law which applies to change of locality of trial in debris suits brought by counties or cities:

SECTION 1. Section three hundred and ninety-four of the code of Civil Procedure of California is hereby amended to read as follows:

SECTION 394. An action against a county, or city and county, unless such action is brought by a county, or city and county, in which case it may be commenced and tried in any county, or city and county, not a part thereto; provided, further, that whenever an action is brought by a county or city against citizens of another county, or a corporation doing business in the latter, the action must be [on the motion of the defendant] transferred for trial to a county other than that in which the plaintiff is situated, if the plaintiff be a city.

Sec. 2. This Act shall take effect and be in force from and after its passage.

As a question of right in common law, there is really nothing in this that is objectionable, because the principle therein contained is correct and has been in practice in all courts. In a case where a court is an interested party, he calls a disinterested judge to preside for him. A man who has a case in court, and has reason to believe that owing to prejudice existing there against him he cannot obtain justice, he applies to the court for a change of venue to some court where he can have an impartial trial, and whenever the court is satisfied on such point he grants the request and it is taken to a court agreed on. Whatever we may think to the contrary, we must have faith in all our courts to do justice, and as each Superior Court has the same jurisdiction, they will no doubt decide cases according to the law, and it does not affect United States Courts.

MARKET PRICE OF SILVER BULLION.—The Acting Secretary of the Treasury, in answer to the Senate resolution, says the basis on which he estimates the market price of silver is the daily quotations of silver in London, New York and San Francisco. The market price the Secretary estimates from a comparison of these prices and the prices at which silver is offered for sale to the Government, the rule being to accept the lowest offers, provided they do not materially exceed the highest market price in the three named cities. Nettleton further states that no silver bullion has been purchased by the Government outside the United States, but undoubtedly large quantities of foreign silver bullion have been delivered on purchases to the Government made from parties residing in the United States.

THE BIG-TREE RESERVATION TO BE CLEARED OF SETTLERS.—Commissioner Groff's report and suggestion on the Kaweah Colony, in which it is proposed to permit the settlers to remain where they are, under specified conditions, on the ground that they would protect the big tree instead of destroying them, does not seem to please Secretary Noble. He will, it is said, prepare a statement claiming that the settlers cannot be tolerated on the reservation, and that if the law cannot reach them, he would recommend that their land be condemned and appraised and the colonists paid for their claims and improvements.

THE APPROPRIATIONS.—The following is an approximate statement of the appropriations made at both sessions of the Fifty-first Congress, prepared by the clerk of the Senate Committee on Appropriations: Amount of regular bills, including the deficiencies and miscellaneous appropriations for the first session, \$361,700,000; amount of regular bills, including deficiencies and miscellaneous appropriations for the second session, \$405,000,000; permanent appropriations for the first session, about \$101,000,000; and permanent appropriations for the second estimated at \$123,000,000. This makes a grand total of \$989,700,000.

THE LAW'S DELAYS TO BE REDUCED.—A recent rule made by the United States Supreme Court will do much to prevent delays that have been vexatious and costly. It provides that all cases must be docketed within 30 days of the taking of the appeal from the decision of the lower court. Before this, litigants whose main motive for appealing a case was to gain time allowed months to go by after notice of appeal before they filed their papers. The rule will be a godsend to the court as well as to honest litigants, for it will reduce the calendar.

Amalgamation at the Comstock Lode.

A Historical Sketch of Milling Operations at Washoe and an Account of the Treatment of Tailings.

NUMBER V.—CONCLUDED.

[By A. D. HOBBS, JR. Read before the American Institute of Mining Engineers.]

The sand was that part of the tailings which had escaped from the stamp-mills, and after passing through numberless blanket sluices and other concentrators, finally had been caught in reservoirs. Some of this material was purchased. By far the larger part came from the company's large reservoir on the flat at the mouth of Gold Canyon, three miles or more from the nearest quartz-mill. Into these reservoirs were led the waters of the creek, carrying not only the residues from the blanket sluices above, but also various impurities discharged into the canyon or washed down by the rains. The inflowing stream was watched night and day by men who decided from its appearance whether it held a sufficient amount of pay material to be allowed to settle in the reservoir, or whether the contents were too poor for profitable treatment, and therefore were to be turned back into the creek-bed. When one reservoir was filled with the water, the stream was led into another, and the material in the first was allowed to settle, the cleared water being then drawn off. In this manner the reservoirs were gradually filled with sand, which was allowed to remain undisturbed for a long time, and then was plowed up and more completely dried under exposure to the air. During the dry hot summers at Dayton, evaporation proceeded at a rapid rate.

The material deposited at the upper end of each reservoir, near the inlet, was left untouched, being too coarse and poor. The remainder, which held a little slime and assayed over \$5 to \$7 per ton, averaging only a shade over \$5 during the years 1875 to 1877, was scraped up and hauled into the mill.

The sand formed 90 to 95 per cent of the whole amount amalgamated in the period mentioned above. It consisted principally of fine quartz sand, whence its local name, and held limited but varying amounts of clay, iron and copper pyrites were distinguishable, but beyond this the mineral composition was doubtful. The quicksilver used for amalgamation by the mills overlooking the original ore had been thoroughly removed by the repeated concentration to which the material had been subjected before reaching the reservoirs.

Although the Janies had discovered and made known the proper method of amalgamating tailings, it was necessary for each mill to work out certain details best suited to its own special conditions. At the Lyon mill tests were being made continually to determine what modifications were required by the varying character of the tailings, and no trouble was spared to make these tests accurate. No experiment was considered satisfactory unless sufficient material had been treated to give results in bullion. Hence, a week's run at least was made in each instance, and often a month was taken to complete a test. Moreover, as an exact knowledge of the results which were being obtained in actual practice was considered a necessary basis for all efforts at improvements, great pains were taken to determine accurately the amounts and values of the material worked.

All the slimes, being purchased, were of course weighed. The sand was measured by carloads. To decide the weight of a load, in the beginning 1200 weighed tons were hauled, and check-tests were made subsequently from time to time.

To determine the value, a scoopful of material was taken from each car and put in a box. At the end of each day the sample thus collected, marked with the date and the number of carloads, was thoroughly mixed and its moisture determined. Sometimes, these samples were assayed each day for gold and silver, but, usually, amounts proportioned to the number of loads were weighed out daily and the assays made once a week.

Four samples were taken daily from the mill—one, of the sand worked in the large pans; another, from the large settlers; a third, of the slime-charges of the small pans; and a fourth, from the small settlers.

In getting the settler-samples, a dipperful was taken from near the surface of the charge just before each plug was pulled, and poured into large huckets. At the end of the day, after thorough settling, the supernatant water was siphoned off carefully, and the residue dried for assay. This method seems preferable to the more usual way of taking the sample from the material as it runs out of the plug-holes. At Dayton, the percentage of yield, calculated from the settler-assays, did not usually differ from that obtained by the bullion-product by more than one-hundredth of the assay-value of the material milled.

Ten one-ounce assays were made of each sample. The silver heads obtained by cupellation were parted in two sets of five heads each, giving a check-assay of the gold, in weighable quantities. As the assay-tables used (Taylor's) were calculated for half-ounce assays, on averaging the results, any error was divided by 20. This gave most accurate results, but entailed a great amount of work. Work, however, was not spared at the Lyon mill.

The pans all ran four hours. With the low-

grade material treated, any increased product arising from longer amalgamation was more than counterbalanced by the increased expense.

While the pans were being charged, live steam was introduced until the pulp was heated to a degree just bearable to the hand. No advantage was derived from greater heat; on the contrary, a higher temperature was apt to volatilize the mercury, which occasionally was found condensed in the caps of the driver. This was taken as proof that the pans had been run too hot.

The salt was introduced at once with the tailings, and the bluestone was added about half an hour later. After the pans had run nearly an hour, and the pulp had been brought into proper condition, the quicksilver was charged.

The amount of sulphate of copper used, while varying with the different materials treated, averaged about 10 pounds per ton for the sand-pans and 20 pounds per ton for the slime-pans, calculated in terms of crystallized bluestone. When the loss of quicksilver commenced to increase, either more bluestone or more acid was charged, according as outside conditions made it more convenient, and always with improved results. The useful effect in such cases, I am inclined to think, was due to the excess of acid, which might act chemically or mechanically on the clay in the mass. It is possible that the acid may have combined with the clay to form alum, which, according to Melagull and Durocher, acts beneficially in amalgamation.

From 2 to 2½ pounds of salt was used to each pound of bluestone. Careful experiments determined decisively that no better results were obtained with greater proportions of salt, and that it was not safe to use less.

The quicksilver charge was 50 pounds to the ton for all tailings (sand or slime) usually coming to the mill. For uncommonly rich slimes the amount was increased.

Much stress was laid on having the pulp in the pan of proper consistency. Repeated tests had shown that better results were obtained with a thick than with a thin pulp. The pulp was considered thick when it would drop slowly (not run) from a stick which had been dipped into the charge. With the right consistency, the mass had a slow, rolling motion, and the quicksilver could be seen in small globules thoroughly disseminated throughout it.

In 1877, a long series of exact experiments was made to determine this question afresh. The results are given below. The column headed "tons per charge" shows the relative thickness of the pulp. Seven tests were made with sand, and six with slimes. One of each (No. 3) misarranged. More than 19,000 tons of sand and nearly 2200 tons of slime-charges were used in the experiments.

In every test a much larger percentage of the silver was extracted with thick pulp than with thin charges. The evidence here seems to be conclusive. With reference to the gold, the results, although not decisive, tend in the same direction. With the richer material (slime-charges) a gain is evident, while with the poorer (sand) the loss per ton of this metal seems to have been reduced to a minimum with both thick and thin pulp.

Number of Tests.	Tons of Pulp. Charge.	Tons per Ton of Tailings.				Yield per Ton of Tailings.				Loss per Ton.			
		Assay.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	
1 and 2.	6.584	Thick.	1.45	11.78	1.76	13.64	10.06	0.73	10.84	81.3	44.1	80.0	
3.	3.811	Thick.	1.46	13.35	1.46	13.35	10.06	0.73	10.84	81.3	44.1	80.0	
4.	3.811	Thick.	1.46	13.35	1.46	13.35	10.06	0.73	10.84	81.3	44.1	80.0	
5.	3.811	Thick.	1.46	13.35	1.46	13.35	10.06	0.73	10.84	81.3	44.1	80.0	
6.	3.811	Thick.	1.46	13.35	1.46	13.35	10.06	0.73	10.84	81.3	44.1	80.0	
7.	6.972	Thin.	2.75	4.40	1.03	5.40	2.71	0.25	2.96	0.16	23.0	1.69	
8.	4.331	Thick.	3.13	3.62	1.10	4.72	2.64	0.20	2.80	70.1	23.2	69.2	
9.	4.052	Thick.	3.25	3.01	1.15	4.72	2.64	0.20	2.80	70.1	23.2	69.2	
10.	2.858	Thick.	3.22	3.78	1.15	4.83	3.03	0.32	3.35	80.1	25.0	65.0	
11.	12.281	Thick.	3.22	3.07	1.13	4.80	2.75	0.25	3.06	75.8	25.0	63.8	
SLIME-PANS													
1 and 2.	6.584	Thin.	1.08	20.15	3.51	23.06	15.00	1.39	16.30	74.4	30.8	60.3	
3.	6.584	Thin.	1.45	11.78	1.76	13.64	10.06	0.73	10.84	81.3	44.1	80.0	
4.	6.584	Thin.	1.46	13.35	1.46	13.35	10.06	0.73	10.84	81.3	44.1	80.0	
5.	6.584	Thin.	1.45	14.15	2.76	16.91	12.10	1.30	13.39	85.9	43.6	79.5	
6.	6.584	Thin.	1.45	14.15	2.76	16.91	12.10	1.30	13.39	85.9	43.6	79.5	
7.	6.584	Thin.	1.45	13.20	2.27	15.68	11.38	0.97	12.35	85.6	42.5	79.5	
8.	6.584	Thin.	1.45	13.20	2.27	15.68	11.38	0.97	12.35	85.6	42.5	79.5	

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

AMADOR.—*Cor. Ledger*, March 7: The Keystone mill, after being idle for the past two or three months, started up again last week. We hope this grand old mine will be kept running for some years to come. The sinking of the shaft at the South Spring Hill mine is finished. They will now drive a crosscut drift at the 900-foot level to strike the ledge. It is supposed they will have to drive from 200 to 300 feet.

FOREST HOME.—*Cor. Ledger*, March 7: Stanley Green & Co. propose opening the gravel beds of Forest Home. They contemplate laying a pipe from the Page ranch to Forest Home, a distance of one and one-half miles. There is a crew of men at work already, making pipe and cleaning ditch, all of which has caused quite a stir around here. There are also negotiations on foot for running a bedrock flume from the old Bliss mine through the Devore ranch, which we think will be a profitable enterprise.

BELMONT.—*Ledger*, March 7: At this mine the surface tunnel has been advanced 25 feet during the last week. Twenty-five feet yet remain to be driven before the ore body is reached. The ten-stamp mill is now being put in condition with new shoes and dies.

SUTTER CREEK.—*Cor. Amador Ledger*: The making of the pipe for the Mahoney is being pushed ahead. They have now been working on the job for six weeks, and it will take three weeks more to complete it. A force of men will soon be put to work grading and digging ditch, and this work will take in the neighborhood of a month to finish. D. K. Valentine is up from San Francisco, looking after Mahoney mine affairs. He says that operations will be commenced as soon as the weather is sufficiently settled to enable the men to work.

PLYMOUTH.—The placer miners are out in full force, looking for gold in the gulches where the late rains have washed the earth away and left the shining metal exposed. Some nice specimens have been picked up in the last few days, some pieces weighing as high as one ounce.

El Dorado.

***AROUND GEORGETOWN.**—*Gazette*, March 4: We understand that rich pay has been struck in the Jones Hill quartz mine. Most everybody in the district is either mining or prospecting for a mine. Frank Silva is going for a big lead of decomposed quartz on his town premises which shows big prospects. Wm. Gibbs and Cad Spencer have leased the Bercaw seam mine, east of Hotchkiss Hill, and started to drift. The O. K. quartz mine, just east of town, owned by County Coroner Dr. Spencer, is showing up a large body of good quartz on the tunnel level. We expect to see a mill pounding out bullion on the O. K. next summer. The hoisting works on Van mine are finally completed, and work of extracting and milling ore will now begin. Some new developments have been made on the Bright Hope mine this winter. The main or shaft ledge has been uncovered on the north end nearly level with Dark Canyon, showing a width of ten feet, and free gold throughout. From this point 360 feet in depth can be gained by 560 feet of tunnel along the lode to the shaft.

Nevada.

RICH ROCK.—*Grass Valley Tidings*, March 3: A number of owners of the Federal Loan quartz mine in Nevada district were in town to-day. They were showing specimens of rock from the 300-level of the mine containing sulphurets and free gold. The rock was commented upon very favorably by those who examined it to-day. The owners are confident that they have a rich mine and we hope that their expectations may be realized.

ANOTHER DIVIDEND PAYER.—*Grass Valley Union*, March 11: The W. Y. O. D. Mining Company, which is becoming prominent among the new mining enterprises of the district, declared its first dividend on Monday of five cents per share upon the capital stock of 30,000 shares, amounting to \$500, which will be payable on the 15th inst. The accumulated fund and the reserves of ore now in sight justify the company in commencing the payment of dividends, which it is expected will be declared monthly for an indefinite time. In addition to the payment of dividends, the company is about to put up a larger mill, having purchased the Canada Hill ten-stamp mill, with its complete equipment of four Frue concentrators, pans, etc., which will largely increase the crushing capacity, which is now but a small five-stamp mill. This new improvement, it is estimated, will cost the company \$15,000, but the present product of the mine is sufficient to meet this expense, as well as to maintain the dividends as above stated. The levels opened in the mine now show at least 5000 tons of ore in the stopes, all of good paying quality. The mine is now regularly producing in bullion twice the amount necessary to pay operating expenses. The future of the mine is full of promise.

ST. JOHN MINE.—*Grass Valley Union*, March 4: The west drift from the 150-foot level of the St. John mine is getting into good ore. At a distance of 70 feet west of the shaft the vein is found to be full two feet in width, the quartz being of excellent appearance, containing sulphurets of good quality, and prospects in gold. The quartz indicates that a pay shoot is coming in, and it is the anticipation that the vein will grow stronger and improve in quality as the drift is extended. The vein stands almost perpendicular, with a slight dip to the south. The St. John is considered to be on the same vein as the Coe mine, which is probably the same vein as the Idaho and Eureka, but this has never been practically demonstrated by actual exploitation, although the strength of the vein, and its east and west course, with the general appearance of the quartz, goes to sustain that theory. The St. John mine is located to the north of town, and in the part of the district where but little mining has ever been done, and the opening up of a paying mine in that locality would have an important bearing on the future prosperity of the district.

W. Y. O. D. MINE.—*Grass Valley Union*, March 5: Rich quartz is being taken from the 700 level of the W. Y. O. D. mine. The quartz is liberally sprinkled with coarse gold, and carries high-grade

sulphurets. The vein from which this quartz is taken is two feet in width. The mine is now yielding profitably all the time. The shaft is being sunk for the No. 8 level, and the vein in the shaft is showing a size of four feet between walls.

WASHINGTON.—Work on the Washington quartz mine at Ormonde, which was suspended some weeks ago by the shortness of the water-power, has been resumed again, and the mill is running with its full head of 20 stamps.

ST. GOTHARD.—Good ore is said to have been struck in the St. Gothard mine, near Columbia Hill. This claim is near the famous Delhi, and its principal stockholders are also members of the Champion Mining Co. of Nevada City.

NORTH BANNER DIVIDEND.—*Grass Valley Union*, March 8: The North Banner Consolidated Tunnel Co. declared its first dividend yesterday, the amount being five cents per share, aggregating \$500. This is the commencement of regular dividends, as the company has been accumulating a surplus for some time, with a view to paying dividends regularly when once they were commenced. The company as present organized has been operating for several years, until the mine is well opened, and a good stamp-mill and other structures are erected upon it. The mine itself has paid for all the improvements put upon it in the last 18 months, without any call upon the stockholders. This has been accomplished through the energy and judgment of George Fletcher, the principal stockholder and manager, and John Skewes, superintendent, who may well be congratulated for opening so valuable a mine as the North Banner is now and promises to be for the future. At the meeting of the directors of the company yesterday, T. J. Mitchell was elected secretary to succeed M. J. Farrell, who resigned, as he expects to be absent for some time during the coming season.

ORLEANS.—The Orleans M. Co. contemplate resuming work this season by sinking a new shaft on the property about 200 feet south of the boundary of the Empire claims. The shaft is to be sunk on what is known as the Fillmore location. The company is disposed to sink a vertical shaft, and to a depth of 800 feet. Owing to the flat dip of the veins in the district, the mode of sinking has always been by incline shafts following the dip of the veins. This gives the opportunity to note the characteristics of the vein, and enables quicker and less costly sinking than if the shafts were sunk vertically through the country rock, which is usually harder and more compact than the ground immediately inclosing the veins.

Orange.

ORANGE COUNTY QUICKSILVER.—*Santa Ana Blade*, March 4: A short time since quicksilver was found within sight of Santa Ana and almost within a stone's throw of Tustin, on a portion of the San Joaquin ranch. The discovery of quicksilver at the point above mentioned is largely due to an accident, as has been the case in a great many other valuable discoveries in this State. A little more than a year since a gentleman, who was hunting for building stone on the San Joaquin ranch, was attracted to this butte by the peculiar color of the boulders cropping out, and their large size. While breaking open some of the stones he discovered a peculiar kind of mineral, the character or class of which he could not determine—not being a practical miner or mineralogist. Some of these specimens fell into the hands of Dr. Kimball, a miner and assayer of this city, and the doctor, after a careful inspection, pronounced it quicksilver. Further investigation proved that some of the specimens were very rich in horn quicksilver, or chloride of mercury. Recently one of the owners of the grant has commenced the work of development on the lead, and a couple of men have been at work running a drift into the face of the hill with a view of cutting the veins. So far they have succeeded in cutting through one vein, which is about two feet thick, with a tolerably well-defined hanging and foot wall. The cut will be extended at least 50 feet farther into the hill in the hope of cutting other ledges.

Shasta.

BULLION.—*Shasta Courier*, March 7: Six bricks of bullion from the Iron Mountain mine, estimated to be worth \$700 per brick, were shipped last Tuesday.

IGO.—*Cor. Shasta Courier*, March 7: The contractors on the Crystal tunnel are making good headway. This tunnel is expected to open a good paying vein of mineral, which surface indications point to as being probable. Work on the Chicago is suspended for the present. P. Gibney's mines are not being worked, pending a final decision as to the title of Sec. 16. The Wright boys are doing some successful sluicing in Bogus gulch, with good prospects of finding a rich ledge. Hubbard & Castel have completed a successful run in their astrara of Cold Spring ore. Shirland & Bro. are running their astrara on a new find on their Creighton ledge. E. L. Ballou's astrara is running on his manzanita ore. W. P. Litten's astrara is running on Continental ore. The Eubanks boys are grinding Live Oak ore in their Andrews creek astrara. The rains have started up a good many of the smaller placer prospects about town.

SURPRISE.—*Shasta Co. Democrat*, March 4: The Surprise mine on Salt creek, four miles from Redding, on the old Shasta road, is developing into one of the best pieces of mining property in the county. J. W. Copeland, the owner, is now shipping ore to the Selby reduction works. The rock from this mine averages \$105 per ton in gold.

Sterra.

THISTLE SHAFT.—*Mountain Messenger*, March 7: The report is that gravel that prospects well has been found in the Thistle shaft, near Gibsonville. There was no question about a gravel channel being where the shaft was sunk, for the reason that years ago the lead had been worked in the Chalcedony, Bootjack, Goahead, Brown's claims and others. In the fall of 1889, a contract was taken by two men to sink the shaft to bedrock. The heavy snow of that year came before they had fairly got ready, which, with other causes, contributed to their failure after the shaft had been put down over 400 feet. Near the end of last year F. A. Gourley took the shaft in hand and completed it. The gravel prospects about the same as that found in the adjoining claims on the channel above, and just what will be done is not known, but it is said that a tunnel will be started in Wallace creek to tap the channel at the western end of the company's ground.

GOLD.—Considerable gold has been picked up on the river bank this week. Henry Meyer found a nice specimen weighing about \$15. August Costa panned out a little over \$3 in a short time, besides a few dollars more which was found by different parties.

Siskiyou.

BLUE GRAVEL.—*Yreka Journal*, March 4: Lee, Lash & Co. are still taking out big pay from their blue gravel claim at the Scott Valley wagon-road crossing, about a mile south of Yreka. They have worked through about 60 feet of blue gravel, and still find the bedrock pitching under the hill, with the auriferous blue gravel averaging about five feet in thickness from the red cement covering to the bedrock. The claim has been opened sufficiently for drainage to the pump shaft, some 80 feet deep, so as to permit four drifters to keep steadily at work, who take out about \$25 a day each. As the claim is opened to better working advantage, the drifters can take out considerable more blue gravel. The red cement covering of the blue gravel, which seems as tough as Roman cement, is also taken out and laid one side for slacking by the effects of the sun and air, so that it can be washed, as it also contains gold in good paying quantity. The discovery of a rich paying blue-gravel bed in this claim, of the most extensive character, will no doubt encourage enterprising efforts to find the same channel in various other sections, where traces of it are plainly visible. Louis Gilbert, who has been sinking a shaft in the Kildore hills, about three miles south of Yreka, on east side of stage-road to Gazelle, was obliged to suspend operations some days ago on account of too much water during the late storms, and is now getting ready to timber the shaft and put in a good pump. He feels confident that he will strike blue gravel in another week's work of sinking. It is confidently believed that blue gravel exists under the Kildore hills, as well as at Greenhorn, and that the main channel runs along the east side of Yreka basin, and thence along the old Oregon road, crossing Shasta river at Fick's, extending a little east of north toward Willow creek, Cottonwood creek and Siskiyou mountain. Several locations have lately been made all over this section, with the intention of prospecting for blue gravel. The hydraulic miners at Seiad and vicinity, on Klamath river, are commencing operations this week, the late rains and snow-storms having furnished a good supply of water, sufficient to afford a good average season. With a powerful pressure of water and the use of considerable powder, the great banks will be leveled rapidly in delving to the bedrock for the glittering ore. Good prospects have been found in the Morris & Roberts quartz ledge on Hungry creek, bonded some time ago by Jones & Hazlett, who will undoubtedly make arrangements to open it on an extensive scale during the coming summer. Jilison & Co. are at work getting out blue gravel from their drifts, and will have a very good supply of water for their giants, as there is about five feet of snow on Siskiyou mountain at the head of the ditch and above, to keep the ditch well filled for some months to come.

Trinity.

MILL RUNNING.—*Trinity Journal*, March 7: Just before going to press we learn that the mill on the Chloride mine is running day and night and ore is being taken out to keep the mill going. We expect the Buck's Ranch mill is also running.

Tuolumne.

BADGER.—*Union-Democrat*, March 10: We understand that the Badger mine, situated near and below the Rawhide mine, in the western part of the county and now bonded to Geo. Stayton, is looking well as the work of development proceeds. The mine was opened years ago, and like hundreds of mines of good promise in those early days, was abandoned, because miners then were not satisfied unless they could rapidly make exorbitant profits. This is all changed now. The abandoned mines of early location are now being relocated and developed and many are in operation most profitably.

HYDE.—The sulphurets from the Hyde mine will be treated at the Reduction Works near town, now owned by Messrs. Kustel, Ahlborn & Melwitz. The news from the Kanaka mine, near Groveland, is very favorable. The mill is in steady operation, giving good results. It is a promising property.

NEW ALBANY.—The work of removing the water from the New Albany mine, the property of Dr. John Walker, will soon begin and mining operations be resumed. Those best acquainted with the ground agree that the lower workings are favorable for profitable returns in the mill. The shaft in this mine is 800 feet deep and drifts have been run at different levels. It will take about six weeks, after work starts, to extract the water.

NEVADA

Washoe District.

CON. CAL. & VA.—*Virginia Chronicle*, March 7: There has been extracted from all parts of the mine during the week 1507 tons of ore, which was shipped to the Eureka mill. The average of all the ore worked at that mill during the week (1545 tons) was \$29.60 per ton. Bullion shipped to Carson mint, assay value, \$49,293.36.

OPHIR.—The west crosscut on the 1300 level is passing into material that gives low assays.

UNION CON.—East crosscut No. 2 on the 1465 level continues in a clay and porphyry formation of a favorable character. Repairs to the shaft are progressing favorably.

MEXICAN.—On the 1465 level No. 1 crosscut east is making good headway without change of formation worthy of note.

ANDES.—During the past week north winze from 350 level was sunk 13 feet, passing through quartz that yielded very low assays. North drift on 420 level was extended 15 feet in a formation of quartz, clay and porphyry.

UTAH.—On the 725 level the northwest drift from the shaft has been extended 48 feet, total length, 526 feet, passing through vein porphyry showing some clay.

OCCIDENTAL.—Extracting ore of fair quality from the stopes on the 400 level. South drift from No. 3 upraise, 40 feet below 450 level, is in 28 feet, showing ore of good quality. South drift from bottom of No. 5 winze, 650 level, is in 113 feet; face in quartz and porphyry.

CROWN POINT.—The west crosscut on the 500 level has been advanced 25 feet since last report; total length, 117 feet. The face is composed of soft

porphyry, with small seams of quartz through it, and a little water running from the face. Are still engaged on repairs on the 600 level.

SEG. BELCHER.—The east crosscut from the south lateral drift on the 600 level is still in a formation the predominant material in which is clay.

CHALLENGE AND CONFIDENCE.—The joint Confidence and Challenge raise from the 750 level is up 172 feet. The joint Confidence and Challenge west crosscut from the north drift on the 1100 level is out 218 feet, 18 feet having been made during the week. The top is in porphyry.

SILVER HILL.—The 500 level is being opened out in a promising formation. There is no trouble on account of water.

KENTUCK.—Good-looking quartz, carrying some metal, is encountered in the raise from the 1000 level. Some pay ore continues to be found in the east crosscut from the north drift on this level. The north drift from the west raise is in material giving low assays.

ALPHA & EXCHEQUER.—Have completed retimbering shaft and resumed work in mine to-day.

WARD COMBINATION.—East drift from the 1800 station is out 870 feet; face in clay and porphyry.

CHOLLAR.—Winze 80 feet south of north line, 750 level, is still going down in a mixture of clay, quartz and porphyry; down 92 feet. Extracted and sent to the mill 496 tons of ore. The ore sent to the mill will average \$17.50 per ton.

BELCHER.—The 1400 level east crosscut has passed through what is thought to be the hanging wall, and has entered vein material composed of low-grade quartz and porphyry. It is out a total distance of 93 feet.

POTOSI.—On the 930 level the east crosscut 400 feet south of north line is out 165 feet; face is in porphyry. The winze is down 80 feet below the 1300 level; bottom in clay and porphyry. East crosscut from winze, 1300 level, is out from the foot-wall 16 feet; face in porphyry streaked with quartz.

JUSTICE.—The north drift 822 level is out 382 feet. The face is in hard ground. We have about 70 feet to go to connect with the bottom of the 622 winze.

CON. IMPERIAL.—Work is still being confined to following up and taking out small streaks of ore on the upper levels and overhauling the old stopes of the mine.

SAVAGE.—During the week have hoisted 776 carloads of ore from the 300, 500, 750 and 900 levels and intermediate below the 1300 level. Shipped to the Mexican mill 534½ tons and milled 450 tons of ore the average battery assay of which was \$7 per ton. Bullion on hand and at the mill amounting to \$24,342.

HALE & NORCROSS.—On the 1100 level the east crosscut on our north boundary has been advanced 22 feet, making its total length 180 feet. The face continues to show low-grade ore. From the east crosscut, 900 level, are stopping ore of fair quality. The north drift from the 800 level of the Hale & Norcross is advanced 50 feet in Savage ground. This drift continues to show fair-grade ore.

OVERMAN.—Have extracted 444 tons of ore. Car sample assays average \$12.34 per ton. Shipped to the Brunswick mill 300 tons of ore. Battery assays average \$14.63 per ton. On the 22d shipped three bars of bullion, valued at \$10,482.

BEST & BELCHER.—1200 level: west crosscut No. 1 has been advanced 22 feet; total length, 162 feet. Face in porphyry, clay and quartz.

GOULD & CURRY.—800 level: The usual amount of ore has been extracted from the old stopes and winze No. 1. South drift from bottom of winze, has been extended 12 feet; total, 22 feet; face in quartz of no value.

Highland District.

ANDERSON.—*Pioche Record*, March 4: Boh McLaughlin, who has been working for some time on the Anderson mine at Highland, has struck some good ore. It was first uncovered several weeks ago and opened up well but immediately pinched again. A few days since it opened better than before and still continues, leading the owners to think the main ore body is found at last, as this claim has produced a considerable quantity of ore in the past from narrow seams and all of a high grade. The claim is situated on the hill north of the Highland brewery and east from the Mendham mine.

Oseola District.

IMPORTANT PLACER STRIKE.—*White Pine News*, March 4: From A. J. Millick, who came over from Oseola Sunday, we learn of a new and important strike made in a placer claim located by Boone Tifford about three miles and a quarter south of Oseola and about a quarter of a mile south of the old Mary Ann quartz claim on the west side of the Snake range. After sinking through a hard-cap about a foot thick and then through five feet of lime, cement pay gravel was encountered, which at the time Mr. Millick left was known to be eight feet thick with bedrock yet to be reached. One hundred shovels of dirt were put through a dry washer, which was but the work of a few minutes, and \$16 was the result. If there was any coarse gold it was not saved, as anything of the value of 50 cents will not go through the screen. About 12 claims have been taken up in the immediate vicinity. The gold is worth about \$16 to the ounce. This showing speaks for itself and indicates that there are possibilities for Oseola that have not been dreamed of up to the present.

GOLD QUARTZ.—A. J. Millick, who has been driving the Union Jack tunnel for the purpose of cutting the Butterfield lode, reports that 262 feet from its mouth the ledge was struck and cut through showing it to be 26 feet wide and carrying gold all the way. At the point where the ledge was cut it is about 140 feet to the surface. The claim is owned by John Butterfield of Boston. The Cumberland, another claim of merit, is worked through a shaft 100 feet deep. A drift from the shaft 40 feet from the surface shows free gold all over the face. This claim is also owned by Boston parties. Mr. Millick thinks the outlook for Oseola at present is particularly bright.

Tuscarora District.

NEVADA QUEEN.—*Times-Review*, March 7: North drift, 650 level, has been extended 28 feet. The vein continues low grade, with a slight flow of water.

NAVAJO.—North intermediate drift from No. 5 chute, 350 level, extended 12 feet. The face is beginning to show good ore, vein fair size.

BELLE ISLE.—The rich ore continues in the 350 stopes. The west crosscut, 450 level, has been ex-

tended 14 feet, cutting a vein of medium grade ore about six inches wide. The south drift from the west crosscut, same level, extended 20 feet; the face is in very hard rock.

COMMONWEALTH.—West crosscut on the 4th level extended 39 feet, face showing seam of clay. East crosscut has been advanced 24 feet all of which had to be timbered on account of cutting into the foot-wall of the vein. Have penetrated the vein five feet, all of which gives low assays. A large amount of water is coming from face of crosscut.

NORTH BELLE ISLE.—North drift from Belle Isle, 450 level, extended 13 feet. Some good ore is beginning to come in the face. The 500 stopes are looking fine. Broke nine cars of first-class and 34 cars of concentrating ore. No. 4 upraise, 600 level, continues to pass through seams of ore lying pretty flat. The leasers are generally doing fairly well, and their ore is pretty clean and high grade.

NORTH COMMONWEALTH.—Hoisted 18 cars first-class ore, assay value \$268 per ton, and 43 cars second class, assay \$19 per ton.

Columbus District.

LEACHING HOLMES ORE.—Walker Lake Bulletin, March 4: The management of the Holmes mine is considering the feasibility of erecting extensive leaching works for the reduction of the vast reserves of low-grade ore which have been passed by in former years as being of too little value to pay for milling. The company has been experimenting on a small scale with the leaching process, and the results of the experiments are more than satisfactory. About 1100 ounces of sulphides were shipped to the Selby smelting works from the Holmes mine last month and netted \$775 above all expenses. The sulphides came from 75 tons of refuse ore from the Holmes waste dumps, treated by the leaching process as an experiment. The success attending the first trial has encouraged the Holmes people so much that works having the capacity for treating 100 tons of ore per day are to be erected in the near future if the price of silver does not drop below that of rock salt. In connection with the proposed new works, Mr. Asa B. Eastwood of the Holmes Co. was in Hawthorne last Sunday inspecting the large roasters and other machinery from the Mt. Cory mill, which is now awaiting shipment to Virginia City. Mr. Eastwood also examined the lumber and timber on hand at Forbes & Tobey's yard and made an inspection of the old leaching tanks of the Cory Co., with the view of purchasing the same if his company decides to build the works. Mr. Eastwood says that the company can work \$10 ore at a profit by the leaching process. At present they cannot touch anything less than \$15 ore, and it requires close figuring to make that pay. He estimates that there are fully 400,000 tons of refuse ore on the dumps, as well as immense quantities of low-grade ore in the mine that can be worked at a profit. And then the mining of the low-grade ore will develop large areas of new ground and it is not improbable that rich bodies will be encountered, as it has proven itself to be most fertile ground in the past.

Pioche District.

THE FURNACE.—Pioche Record, March 4: After a week's effort to get men, a sufficient crew was obtained, and yesterday at noon the furnace blew in again and is now running nicely. La grippe was the cause of the two weeks' shutdown.

White Pine District.

HAMILTON.—White Pine News, March 4: It seems to be an undeniable fact that Hamilton is to be the mining camp of the near future. The ore, which carries 60 per cent lead, some iron and about \$20 in silver, is found in ledges of considerable width. The iron in the ore comes very near meeting all expenses. All is life over that way just now, and old White Pine Mountain is being worked from Sherman town to its extreme north end. Hamilton is the acknowledged center and exhibits considerable life.

ARIZONA.

SLATE CREEK.—Cor. Prescott Courier, March 3: The Slate creek group of mines are on the head branches of the creek, about one mile southwest of the Senator mine, and the same distance east of the Dosoris and Blue Dick mines. There are 18 claims in an area of a mile square, named the Azurite, New Era, Davis Nos. 1, 2 and 3, North Pearl, Helvetia, Albert Hatz, Poverty, West Dunkirk, Dunkirk, San Juan, High Divide, Ridge, Wren, North Wren, South Wren and Esmeralda. Twenty-two persons are owners in these claims. Last fall, in order to get the property in such shape that it could be worked or sold, I made an agreement with the owners whereby I have the authority to dispose of 13 of the claims until next October at a stipulated price per foot. In pursuance of that agreement, I attended to the performance of the title work last year, and am bound to do the same for this year. From eight of these claims, in five years past, about 700 tons of ore have been shipped, averaging in value about \$80 per ton in gold, silver and copper. The ores are heavy in copper and iron sulphurets. From Prescott a wagon-road runs direct across the Hassayampa by Pace's ranch to the foot of the mountain, a distance of 10 miles, whence a pack-trail leads over the range a mile and a half to the mines. It is over this road our ores and those of the Blue Dick and Dosoris mines are taken to the sampling works at Prescott. Following the wagon-road through Maple Gulch past the Senator mine, to the divide between Slate creek and Crook canyon, 14 miles, a trail of a mile in length leads to the mines. The veins are large and well located for working by tunnels. On the property there are nine tunnels, run in on the veins, varying in length from 25 to 250 feet, and a dozen shafts and open cuts, from 15 to 50 feet deep. There are several permanent springs on the claims, and the mines are all wet, so there is plenty of water on the spot for treating the ores, with plenty of pine, juniper and oakwood on the claims and adjacent thereto, and it is safe to say that there is no other group of mines within the same distance of Prescott showing the same amount of ore for the work done, or offering the same inducements for investment.

BRITISH COLUMBIA.

FROM HOT SPRINGS.—Nelson Miner, March 4: Superintendent Thompson reports the United mine looking as if it were sure to be one of the big bonanzas of the Kootenay Lake country. The two-compartment working shaft is down 75 feet, and in ore from grass-roots to bottom. At 50 feet a drift was run on the vein for a distance of 50 feet both ways from the shaft. This work proved the ore body continuous and large, fully 200 tons of ore being extracted in running the 100 feet. At the bottom of the shaft the vein is three feet wide and in solid ore. As work progresses, the indications are that the next 25 feet will expose a larger ore body than either that on the surface or at the 50-foot level. Development work continues on the No. 1, a mine owned by the same company that owns the United. During the winter a drift has been run on the vein for a distance of 100 feet. About 75 tons of high-grade ore was extracted, the character of the ore changing for the better as the drift is advanced. The ore is a carbonate, assaying from \$80 to \$600 to the ton in silver. The vein is about 18 inches wide. Superintendent McGovern reports the shaft on the Skyline down 150 feet. If the ledge is not tapped at 200 feet a crosscut will be run. Work was suspended on the Union shaft at a depth of 90 feet, on account of water. The ore runs from \$80 to \$300 in silver.

SMELETER PROSPECTS.—Nelson Miner, March 4: A well-known railway man, and one, too, that is doing much to attract capital toward the lake country, writes the Miner as follows: "Two companies, or rather two parties with English capital, profess to be able to build a smelter at Nelson, and are negotiating with the Provincial Government for site, etc., but a good live Yankee concern would put them all to flight in the matter of expediency and expedition." The Miner agrees with the railway man; at the same time a little English capital is a handy thing to have lying around loose.

HIGH ASSAYS.—The tunnel in the Silver King is now within 14 feet of the incline shaft, and the noise of the work can plainly be heard in the crosscut at the bottom of the latter. The crosscut is free from water, and there remains only about four feet in the shaft. When connection is made, sinking in the shaft will be resumed, and the tunnel will also be continued on toward the Kootenay Bonanza ground. The same favorable conditions exist in the tunnel—solid ore, carrying away up in silver. The lowest assay obtained this week was \$103 and the highest \$2400. The latter assay was obtained from ore that did not appear to be rich, and the result was quite a surprise to the boys.

PROGRESS ON THE GOLD BELT.—The tunnel on the Wildcat is in 170 feet. Work is now confined to crosscutting the ledge at a point about 70 feet from the tunnel face and to sinking a shaft at a point about 50 feet from the tunnel entrance. John Lodge's Pioneer has a two-foot vein of ore that shows free gold, and next week he will put on an addition to his working force. It is now known that the ore of the Poorman, Royal Canadian, Wildcat and other Eagle Creek gold properties will give a return of over an ounce a ton in gold in actual milling operations.

A NEW DISTRICT.—A report is current in Spokane Falls that a party of prospectors from the Cœur d'Alene country have made rich discoveries on Salmon river, about 15 miles from old Fort Shepherd, and directly on the line of the projected Nelson & Fort Shepherd railway. The ore is said to be gray copper, carrying high in silver. From the description of the location given, the new find is not more than 15 miles distant from the Hall Creek placers and less than 30 miles south of Nelson.

COLORADO.

DUMONT NOTES.—Idaho Springs Gazette, Feb. 28: Work around Dumont has slackened up during the past month, though most of the mines will start up again between this and the middle of April. The last contract on the Elm City has been completed, making the tunnel 330 feet long, with a fine streak in the bottom of the breast. The bids are all in for another 100-foot contract. At the Alexander they have one shift working in one of the stopes. As soon as the mill is ready to run, the force will be increased and considerable development will be done. The management has nearly completed a re-stamp mill at the mouth of the lower tunnel. Ed Bowden & Co. have made a very rich strike on the Big Dipper lode, near the Syndicate. They have over a foot of ore that mills up in the hundreds.

LAWSON.—Markett, White & Co. have made a strike on their lease in the Tabor. Several inches of very rich ore. Another strike of importance is the one made in the lower level of the Orient, which will soon bring this mine to the front. Crosby & Co. have put up a whim on their property on Red Elephant, and are working several men. Another good prospect is the Last Chance, located on Silver creek close to the Jo Reynolds, which has produced some high-grade ore. Ed Fountain has a contract of sinking another 50 feet on this property, which will make the shaft nearly 150 feet deep. This promising property is owned by Mrs. Wm. Raines and others. The Franklin County has now reached a depth of 167 feet, and levels have been started east and west from the bottom with flattering results. Joe Harrison is raising from the second to the first level on this mine, and has six inches of ore. This property has been a steady producer right along. It is owned by Boh Lyons & Co.

IDAHO.

DELAMAR.—Cor. Idaho Statesman, March 4: The main topic of conversation in the camp is the deal lately consummated in the DeLamar mining property, particulars of which have already appeared. A mill will be erected in the spring of the capacity of 100 stamps, and the mine put in shape for a vast increase in the extraction of ore necessitated by the increased number of stamps. A certain number of shares was thrown upon the market here and other parties were given the chance of subscribing for stock, and a grand rush was made by the boys working at the mine and other residents of the camp for shares, and in 24 hours between five and six thousand were subscribed for in DeLamar alone, most of which were taken by the miners, and the number of shares taken was only limited by the number of dollars contained in the purses of the subscribers.

AT SILVER CITY.—Cor. Idaho Statesman, March 2: The Stoddard mine, the pioneer claim of the camp, lies east of the DeLamar group and joins it. It is owned by Regan & Hays, and is now being worked by Senator Jones of Nevada, under the management of John Ludwig of Gold Hill, Nevada. Several other claims belong to this property, but the

work being done is confined to the Stoddard. On the north and west there are several properties that are very promising indeed. The Howe-Manhattan, owned by Davies, Workhill and Howe, is one of the most promising prospects in the camp. This mine has been opened up to a considerable extent, there being about 1500 feet of tunnels and laterals, exposing in many places large veins, some of which are rich in silver. The owners are at present sinking a shaft on the extreme south end of their ground, to cut a vein known to exist there. The Lepley group, also northwest of the DeLamar group, embraces seven claims, all showing good milling ore. Frank Lepley and others are the owners, and they are driving a fine tunnel directly across the property which they intend to make the main working tunnel. Several veins have already been cut, some of which are rich in both gold and silver. Almost immediately north of the DeLamar mines, and adjoining them, is the Alta, owned by T. W. Jones and Steve Ready. This property shows a vein 20 feet wide which looks and prospects well. A shaft has been sunk 60 feet and the owners are building a whim-house and making preparations to sink much deeper.

PINE GROVE.—Idaho Avalanche, March 3: We have been informed by a gentleman who is familiar with the Pine Grove mines, in Elmore county, and the history of the St. Louis Pine Grove mining company, that the company has recently been reorganized and is now in charge of a number of practical St. Louis business men, who propose to work this very valuable holding on its merits—in other words, to do some mining instead of stock speculating. They have had some new surveys of their claims made and are now convinced that their last superintendent was not on the lode which showed so well on the surface, but had been running on a small parallel vein a short distance away. They have engaged Elmer C. Towne, a practical miner and a thorough mining engineer, as superintendent.

WOOD RIVER MINES.—Ketchum Keystone, March 2: The consensus of the opinions of competent mining men seems to be that the ores of the Wood River country are in veins and not in pockets or bunches; that many of these veins are true fissures and therefore lasting, and that there is a fair probability that this will yet prove as much a gold as a silver camp. The recent discovery of the existence of gold in greater or less quantities in all of the iron pyrites in this particular locality, and the other fact that the galenas decrease as depth is attained, while the iron increases, go far to confirm the theory of a gold camp. The fact that the presence of that gold here was not suspected until quite recently proves that the place has been but superficially and carelessly prospected. A result of this knowledge should be to encourage the outlay of both effort and money in the direction of deeper and more thorough and intelligent prospecting, and we think it will. The Wood River region contains a larger amount of low-grade ores than any other we know anything about except San Bernardino county, Cal., but mixed with this low-grade ore there is twice the quantity of high-grade ore that has ever been found in the San Bernardino region.

LOWER CALIFORNIA.

ALAMO.—Lower Californian, March 6: The great rain reached Alamo and temporarily flooded things. Lots of work in the placer mines will have to be done over again. Work on the mines has steadily continued. The Ulises is now 140 feet down and sinking daily. The rock is very rich in sulphurets and enough is produced to keep the Princess mill running. The Ludio continues to develop finely. The Gold Tree has a temporary hoist and producing good rock at 45 feet. A new vein was found Sunday by Santiago Robles near the Ulises, which is very rich. It is supposed to be a continuation of the El Paso. The latter resumed Tuesday under Foreman Church. The Aurora mine and mill are working night and day.

MONTANA.

THE PARROT.—Inter-Mountain, March 2: As soon as the frost is out of the ground, active work will be commenced excavating for the foundation which will be laid of heavy masonry. The engine will be 2x260, two inches larger than any other engine in the camp. The building, an already large structure, will be entirely removed and one to conform to the machinery will be erected. When in position it will be equal to if not larger than the large structure now in course of completion over the Lewisville shaft of the Boston & Montana Co. in Meaderville. Cables will be added and double deck cages, with the exception of the sinking apartment, where it is impossible to use but the single-decker. As soon as these four months after commencement, sinking will be prosecuted to the 1000-foot level. Drifts, levels and crosscuts will be run at every 100 feet and the mine when opened up will be the peer of any in the camp. This mine contains some as fine bodies as can be found in the district.

THE BLUE BIRD.—The closing down of the Blue Bird during the past week was a somewhat serious blow to the towns of Burlington and Rocker, both of them being in a large measure dependent upon that mine. The pumps were raised to the 300 and nothing will be done beyond keeping the machinery in order and preparing the ground in this mine so soft that the water will of necessity do some injury if allowed to stand. So far as can be learned it is the present purpose of the company to do no more work until their present litigation with the owners of the Little Darling is closed. On the other hand, it is understood that the mill will be kept in operation, and in order to keep it supplied the Poorman will be opened up.

THE CAMP.—At the other great mines of the camp there is no news of consequence to chronicle other than they are all working about as they were during the past week. The smelters continue to make their regular shipments, and each and every one of them is kept full to overflowing with ore. The greatest need of this camp at the present time is greater reduction capacity, for as things are at present there is hardly a prospect that does not represent there is a loss of consequence to chronicle their luck, thus making the production greater than the consumption. Mines have been started during the past week that have been for some time inoperative. Chief among this number are the Neptune and Stephens, the former the property of

W. A. Clark, while the latter is the property of the estate of A. J. Davis.

THE CHAMPION.—New Northwest, March 6: The rumors that have been rife for several days of the improved condition of the Champion mine are not without foundation, though some of the stories were greatly exaggerated. Mr. H. H. Zenor states that about Monday the vein in the east level, on which they are drifting, developed a very superior body of quartz, samples of which assay 140 ounces to the ton in silver. The vein covers the hanging-wall, but they have not crosscut it, so that its width is undetermined. In the west level there is a showing of 2½ feet of a fair quality of milling ore, which is being taken out as the work proceeds. The contractors engaged in sinking the shaft have made 90 feet since beginning the work, which now puts the depth at 500 feet, and there is yet 150 feet to be made under the contract.

THE RUBY.—President Halteman, of the American Ruby Consolidated Mining Co., is in the city, and owing to the stringency of the money market has decided that it would be a wise plan to suspend operations on their property temporarily, and accordingly the mine was shut down last Tuesday to await other arrangements of the trustees for proceeding with the work.

THE ZOZEL.—Work was begun last Monday by Contractor C. T. Meador on Zozel property, under the bond recorded a few weeks ago.

THE EMERY.—At the Emery mine the vein of pay rock is still in sight and very uniform in width—from 12 to 18 inches—and always carrying a good body of ore.

UTAH.

CLARA CONSOLIDATED.—Salt Lake Tribune, March 3: Thomas Mackinson is in from Stockton and reports that the Clara Consolidated Co. is making preparations to begin work at an early day on its property. This is the property which Mr. Mackinson has been developing to the extent of his abilities for years, and now that he has incorporated and obtained working capital, the group no doubt will soon become a good shipper. It has some ore in sight and the mine is looking quite well.

THE ELIZABETH.—James McAvoy of Stockton came in yesterday. He has the Elizabeth under lease and is getting ready to soon begin stoping from the good bodies of ore which have been uncovered. He expects to ship much ore in the near future.

BUNKER HILL.—The Bunker Hill mine, lying west and adjoining the Legal Tender, is showing up very nicely. The last ore shipped sold for about \$50 per ton, and there is much of such ore ready for stoping. It runs about 70 per cent lead, hence is a desirable smelter ore.

LITTLE ORE RECEIVED.—The storms of the past few days have so retarded the shipping of ore from the hills that but little is coming in to the smelters now.

MINING MEN ANGRY.—Salt Lake Tribune, March 7: The mining men around town last evening were considerably worked up over the proposal of the Rio Grande Western to raise the eastbound ore rate from Park City. Said several: The Western wants (1) to make Salt Lake and Park City common points. (2) It wants the rate raised from \$7 to \$10, the same as the Salt Lake rate, in order that it may get into that market. You see, the rate being less from the Park than from Salt Lake, the Western cannot haul at less price from Park City than from Salt Lake because of the Interstate law. (3) If the Union Pacific refuse to raise the rate the Western will retaliate by lowering the Bingham-Salt Lake rate to \$7 or even \$6, which will carry all the low-grade ores out of the Territory and ruin the local smelting interests. (4) The Western would rather haul five tons of ore at \$6 or \$7 than one ton of bullion at \$13, and it takes from five to seven tons of low-grade ores to make one ton of bullion. The loss of Park City by the raise in rate would aggregate \$75,000 per annum. The smelters might stand the reduction if there was a proportionate reduction in coke, lime rock, coal and charcoal. But there is no suggestion of this.

WASHINGTON.

THE ADELPHIA SOLD.—Ruby Miner, March 4: The Adelpia, Mountain Queen and Mohawk claims on Ruby Hill have been purchased by the Ruby Hill M. Co. of Spokane, a corporation just organized with a capital stock of \$600,000 for the purpose of conducting mining operations on Ruby Hill. The principal stockholders are O. Jeldness and P. Morrison of Spokane, T. M. Elliott of South Dakota and Andrew Jeldness of Ruby. The vendor of the properties is Andrew Jeldness of this city, who retains an interest in the company. The Adelpia, the first and most prominent of these claims, is the extension of the Fourth of July. There are two leads on the ground, the main one cropping out at both ends of the claim. A 50-foot shaft has been sunk between the two so as to crosscut to each. A 65-foot crosscut to the main ledge shows it to be 13 feet wide, with a clear six feet of ore. The sale of this property was made on sampling this pay streak, which ran \$400 in silver with no lead. Sampling the six feet had given \$600. The ore is precisely the same as the Fourth of July. The claim altogether is more promising than the Fourth was at the same stage. April 1st or sooner, if the weather permits, work will be begun on the Adelpia, with Andrew Jeldness as superintendent. The Mountain Queen is a new claim, having been located less than a year ago. The Mohawk is the south extension of the Wooloomooloo and the lead, while small, carries good ore.

SILVER BLUFF.—Okanogan Outlook, March 3: Gip Chilson came in from the Lime belt after provisions this week and reports very favorably of the Silver Bluff mine, on which he has had a force of men at work for several weeks. In the shaft, at a depth of 100 feet, they have recently struck a body of ore from three to five feet wide, and assaying from 400 to 2000 ounces per ton in silver. They have commenced to sort and sack the ore and will make a shipment of about 10 tons in a few days.

MOHAWK.—Billy Hunt, who recently took a contract to do 100 feet of development work on the Mohawk, was in town last week and reported the mine looking exceedingly well. The ore body is increasing rapidly in width and the quality of the ore is also improving in the most gratifying manner.

MECHANICAL PROGRESS

Detecting Flaws in Metal.

We have already noticed a recently devised instrument for detecting flaws in metal called the "schiesophone." It is an English invention, and the London *Times* makes the following reference to it:

The apparatus consists of a small pneumatic tapper worked by the hand, with which the piece of steel or iron to be tested is tapped all over. Connected with the tapper is a telephone, with a microphone interposed in the circuit. Two operators are required—one to apply the tapper and the other to listen through the telephone to the sounds produced. These operators are in separate apartments, so that the direct sounds of the taps may not disturb the listener, whose province it is to detect flaws. The two, however, are in electrical communication, so that the instant the listener hears a false sound, he can signal to his colleague to mark the metal at the point of the last tap. In practice, the listener sits with the telephone to his ear, and so long as the taps are normal, he does nothing. Directly a false sound—which is very distinct from the normal sound—is heard, he at once signals for the spot to be marked. By this means he is able not only to detect a flaw but to localize it. Under the auspices of the Southeastern Railway Company, a demonstration of the schiesophone was given recently by Capt. De Place at the Charing Cross hotel, in the presence of several members of the Ordnance Committee and other government officials. Some samples of steel, wrought iron and cast iron, which had been specially prepared and privately marked, were tested, and in many cases the flaws therein were correctly localized by the instrument. On the other hand, some bars were broken at points where a flaw was indicated, but where the metal proved perfectly sound. Consequently, however ingenious the invention may be, it can hardly yet be called a practical success.

THE GROWING USE OF WRENCHES.—The number of wrenches sold in the United States, though already large, is constantly increasing, remarks *Hardware*. Large dealers in New York and other cities frequently order 1000 dozen at a time, and a very ordinary order is 100 dozen. Every portion of the country takes them largely, and no particular style seems to sell better than another. A buyer from Germany was in New York last month, and gave an order for a sample wrench of every style and size that could be gathered here. These are to be sent to Germany, and an effort is to be made to introduce, as far as practicable, a full line of American wrenches into that country. Notwithstanding the large demand for these goods, the tendency in prices seems to be downward. Wrenches that were selling two years ago at 35 per cent discount, are now quoted at 50 and 55 per cent. The trade invariably demands an excellent article, and a poor wrench is, as a rule, unsalable. Inventors, within the past few years, have sometimes been so unfortunate as to place themselves in the hands of manufacturers, who, in their endeavors to place a cheap article on the market, have sacrificed quality only to reap what seems to be an inevitable result, failure. Not long ago one manufacturer lost \$30,000 in such an attempt. It was with the greatest difficulty that he could sell the second lot to the same party, and the third order never came. The export trade in wrenches is constantly increasing, the American article meeting with high favor in many countries abroad.

HARDENING STEEL PLATES.—Experiments have recently been made to ascertain whether it can be confidently stated that oil-hardening and annealing, or some such process, is necessary for steel plates. Messrs. Brown and Messrs. Cammell, the two great Sheffield firms, makers of compound armor, are now satisfied as to this necessity. A 9-inch plate of steel was manufactured and out into two plates, each 4 feet square. One piece was left untreated and the other was oil-hardened and annealed. They were fired at by the 6-inch gun with Firth steel projectiles weighing 100 lbs. The striking energy of the blow upon the untreated plate was 2389 foot-tons, and the energy of the blow upon that which had been treated was 2378.5 foot-tons. In the latter case the projectile made an indentation of 10½ inches, so that light was just visible through the center of the bulge at the back of the plate. The projectile rebounded, broken into three pieces. The plate was cracked through, but was whole, and no material was splintered out either at its front or back. In the case of the untreated plate, the shot passed through, and the splintering of the steel around the hole in front of the plate spread over a space of 15 inches across. The splintering around the hole at the back of the plate covered a space of 33 inches across. The plate did not remain whole, but went into six pieces.

STRENGTHENING CAST IRON.—A NEW IDEA IN FOUNDRY PRACTICE.—Some of the English iron-founders have adopted a simple practice in making stronger castings. The method is merely the introduction of thin sheets of wrought iron in the center of the mold before casting. This idea was first applied to the casting of thin plates for the ovens of cooking stoves, and a sheet of thin iron in the center of a quarter-inch oven plate renders it practically

unbreakable by fire. Recently the process has been applied to the casting of large iron pipes, a core of sheet iron imparting additional strength and lessening the liability to fracture. As an evidence of the additional strength that may be imparted by this process, it is stated that a plate of iron, one-fourth of an inch thick, cast with a perforated sheet of 27 wire-gauge wrought-iron in the center, possessed six times the strength of a similar cast plate with no core. The quarter-inch plate thus made had the strength of a plate one inch thick.

NAILS THAT LOOK LIKE SCREWS, BUT ARE MADE TO BE DRIVEN.—The newest thing in nails is a twisted wire nail which is a cross between a screw and an ordinary plain wire nail. This idea is of English origin, and it is supposed to represent as great an improvement upon the plain wire nail as that useful invention is over the old cut nail. As is well known, the common cut nail tears and crushes the fibers of the wood as it is driven, and its tapering shape destroys the greater portion of its holding power when it is partially withdrawn. The plain wire nail, being pointed and smooth, does not crush the wood fibers as the cut nail does, but presses them aside. As the diameter of the nail is the same throughout its length, it fits as tightly and holds as firmly when partially drawn as when driven home. The twisted wire nail not only crushes the fibers of the wood less than the two other forms of nail, but by its screw shape possesses a much greater holding-power than either of the other forms. Quite similar to this screw modification of the wire nail is the recent American idea of making a wood screw that will drive nearly as well as a nail and yet can be withdrawn by means of a screw-driver as readily as any screw.

TESTING STEEL AT LOW TEMPERATURE.—The French Government has caused to be made several tests of gun steel at a low temperature—75 to 100° below zero, F. Part of the bars were hardened and part unhardened. The breaking load was increased by the cooling, three per cent in the instance of the unhardened bars, and six per cent in that of those hardened. But in a shock such as a gun would be subjected to, the unhardened bars, cooled, broke on an average with 5.9 blows, against 14.6 blows under ordinary conditions. With the hardened bars the difference was less, 12.57 blows being required for the cold bars, against 14.4 at the normal temperature. The bars—both hardened and unhardened—had their elastic limit raised 11 per cent by the cold, and their elongation was diminished by 12 to 14 per cent. The bars recovered their original properties upon attaining the ordinary temperature.

A NEW BOILER RIVET.—It often happens in riveting boilers that the rivet bulges in the center, resulting not only in the separation of the plates but sometimes in the splitting of one or both of them. In order to obviate this defect, which very seldom becomes known until the boiler comes into actual use, a rivet has been devised which has a thinned waist to allow for expansion and the nucleus of the hurr already shaped. The burr is thus practically started before it receives a blow, and the fiber of the metal is already inclined toward the position it will be ultimately forced to assume. The result is that the rivet-holes become properly filled with the slightly expanded waist of the rivet; the plates are closely united; the hurr is well formed, and there is no danger of the plates cracking. The riveting is also effected with fewer blows, thus economizing labor.

THE MANNESMANN TUBE ROLLING PROCESS.—It is said, is soon to be introduced into the United States. At the present the process is in operation at Remscheid and Bonn, Germany; Kottmatt, Bohemia and Landore, Wales. It is reported that a company is being organized in Vienna, with a capital of \$3,000,000, for the manufacture in that city of these and other tubes. There is an American process for manufacturing tubes by rolling, in operation at Findlay, Ohio, known as the Kellogg seamless process; but it differs from the Mannesmann process in requiring a hollow ingot and a mandrel; while the latter produces tubes directly from a solid ingot. The Findlay pipes are said to be superior to the lap-welded and also cost less.

LARGE BRASS CASTING.—The Lynn brass foundry has just made for the Thomson electric welding company two copper castings supposed to be the largest ever made. They weigh 1500 pounds and are to be used in the welding machines being erected for the United States government for the navy-yards.

COMPARATIVE COST OF WARSHIPS.—It is said the cost of warships per ton is as follows: England, £30 5s.; France, £46 9s.; Russia, £37 5s. The price per indicated horse-power is: England, £30 4s.; France, £56; and the United States, £67 2s.

The best idea of the value of the Bessemer invention may be formed from the simple fact that when Bessemer began experimenting, steel sold in England at from \$250 to \$300 a gross ton. He soon made a better steel at \$30 a ton.

LOCOMOTIVE PRACTICE shows that steel stays bolted on sooner than bolts made from good brands of iron. The fault, which appears to be incurable, lies in the crystalline structure of steel.

SCIENTIFIC PROGRESS.

Cannon-Ball Photography a Delusion.

The following, from the *Scientific American*, explains itself:

In our number for Jan. 17, we published an engraving of what purported to be a photograph of a shell in flight as fired from an 8-inch mortar, taken on the grounds of the Michigan Military Academy, Orchard Lake, Mich. The photograph was sent to us by J. Sumner Rogers, colonel and superintendent of the academy, who stated it was an instantaneous photograph taken during practice firing under the command of Lieut. Frederick S. Strong, U. S. A.

Thereafter we received the following: "Editor *Scientific American*: I notice in your issue of Jan. 17, 1891, a photo-mechanical print from an original negative of a cannon-ball in motion. If I remember correctly, the experimenters in Hungary, in investigating projectiles in motion, used a shutter speed of 0.000076 of a second, and then found the ball had moved visibly during the exposure. Now I wish to state that at any time of day when a shadow as long as that cast by the figure in the foreground of this picture occurs, and with a lens stopped down enough to give a sharp outline of the distant woods and also of the adjacent officer, and a shutter speed sufficient to get the ball at all, such a fully exposed and graded photograph is an impossibility; in fact, I should say that anything more than the faintest outline of the highest lights could never be developed."

HENRY N. POTTER, "Photographic Instructor Natural Science Camp, Canandaigua Lake, N. Y."

We submitted the above letter to Col. Rogers, who in reply informs us he believed the picture to be genuine, but now finds he foolishly allowed himself to be deceived by a dishonest photographer, who "intensified" the ball so as to make it show in the picture. The colonel regrets, etc.

DO STORMS MOVE IN CYCLES?—The Eureka (Humboldt county) *Times* of Feb. 26, under the head of "Reminiscences of Former Anniversaries"—Feb. 22d—gives an interesting article showing a remarkable regularity in the recurrence of severe storms on or about Feb. 22d, occurring at regular intervals of ten years, from which we extract as follows: Thirty years ago, Feb. 22, 1861, we find by consulting the files of the *Times*, a fierce storm was threatening which three days later culminated in a thunder-storm, which the *Times* says equaled anything experienced in the "most tempestuous climate." Thirty years later—the recent anniversary—the thunder-storm was a little "previous" instead of being "tardy" in celebrating Washington's Birthday. Twenty years ago a fierce storm also prevailed all over the State, and became a regular tornado in some districts, uprooting trees, unroofing houses, etc. It caused much suffering and loss among the stock of this county. Ten years ago the coast was also just recovering from a great storm. An item appears in the *Times* of the 23d, saying that only one bridge remained on the mail route between Aroata and Weaverville.

CORK WORMS.—Investigation in France proves the existence of two or three types of moths in wine-cellar. The grubs feed on the fungoid growth that forms on the wine-vats and moldy corks. The insect bores and forms galleries in the cork nearest to the glass, and through the holes thus formed, air gains access to the wine, spoiling it. In corroboration of the above, it has been remarked that one of the chief difficulties in bottling wines in California has been in obtaining a supply of perfect corks. About 25 per cent of corks, after examination for fitness, are rejected. It is often found that wine after being bottled oozes through the corks. Various methods have been resorted to, to stop the inroads of these grubs. After soaking the corks in hot water and then in brandy, they are dried, and when they are put into the bottles the tops are coated with a layer of paraffine wax previous to sealing them with ordinary wax. Neither the grubs nor the insects feed upon the wine, but simply use the cork as a place to deposit their eggs, and the coating may possibly prevent their entrance.

CURIOSITIES OF IRON.—Add carbon to pure iron and it becomes steel. Add a hydrocarbon to iron, and steel itself becomes so extensively modified that its properties are not recognizable. Thus steel may be as soft as pure iron. Add hydrogen, in varying quantity, and it has the quality of resilience, as in the watch-spring, or the quality of tenacity, as in the knife or razor, or may be given nearly the hardness of a diamond, as in a file. With steel at a low temperature, from 400 to 450° F., edge tools are produced, the color in the yellow shades; from 500 to 525° various sorts of springs are produced, color blue; while by heating iron to whiteness and plunging it into water, which is mainly composed of hydrogen, files are produced or forms even harder.

EARTHQUAKE PHOTOGRAPHY.—Signor Baratta's device is described as follows: The telephone wire is connected with a subterranean microphone. Before the telephone diaphragm (vertical), and connected with its center by a fine aluminum wire, is a short slip of the same metal, fixed below, and having a curved piece at the top, which rests against a small mirror, movable about a horizontal axis. This mirror

reflects the light from a lamp and lens to photographic paper on a rotated drum. The light is momentarily shut off every quarter of an hour by a shutter arrangement, worked electro-magnetically by the clockwork which moves the drum.

CHEMICAL FIRE ALARM.—A new fire alarm now in use in Sweden consists of a small copper cartridge closed by an India-rubber button and filled with a fire composition. The fuse contains a mixture of potassium chlorate and sugar, and on it is placed a paraffine capsule containing a few drops of sulphuric acid. When the temperature of the room rises above the melting point of paraffine, the sulphuric acid is liberated and ignites the chlorate mixture, which in its turn sets fire to the Bengal light. A fusible metal disk placed in contact with the mixture will also be melted and thus make electrical connection with a call bell so as to sound the alarm at a distance.

SNOW WORMS.—A puzzling phenomenon has been noticed frequently in some parts of Valley Bend District, Randolph county, Va., this winter. The crust of the snow has been covered two or three times with worms, resembling the ordinary outworms. Where they come from, unless they fall with the snow, is inexplicable. The snow is two feet deep, and the crust is too strong for them to have come up out of the ground. A square foot of snow can scarcely be found some days without a dozen of these worms on it.

NEW METHOD OF MEASURING EXPANSION AND CONTRACTION OF METALS.—In the physical laboratory of Colby University, Prof. Edward W. Worley, of Adelbert College, Cleveland, and Prof. William A. Rogers of Colby University, have succeeded in measuring, by means of wave lengths of light, the changes in the length of metal caused by radiation of the temperature. A machine constructed by Prof. Rogers for the special purpose was employed, and changes in length were measured in millionths of an inch.

APPLE BLOSSOMS IN WINTER.—Perhaps every one does not know how easily fresh apple blossoms can be had in winter. Get the ends of branches with plump flower buds and place them in water in a warm, sunny window and they will soon bloom. No doubt many other kinds of trees and shrubs will give as good satisfaction as the apple. Here, says *Vick's Magazine* for January, is an interesting field for experiment.

THE LARGEST DIAMOND DRILL BORING in the world has just been completed in Saxony. This hole was drilled near Schladebach for the purpose of testing a coal formation. Three and a half years were consumed in drilling this hole with a diamond drill. The hole is about 11 inches in diameter at the top and 2 inches at the bottom.

SCIENTISTS say that the orange was originally a berry, and its evolution has been going on for more than a thousand years.

BET SUGAR.—The annual meeting of the Western Beet Sugar Co., which is the name of the firm operating at Watsonville, was held on Monday of this week. The old directors and officers were re-elected, and these include Claus Spreckels as president, and W. C. Waters, superintendent, at Watsonville. An evening paper states that the reports of the operations for 1890 show that year to have been a very profitable one. The product of the factory at Watsonville was 2128 tons of sugar, which netted the company \$102 per ton. The profits of the year amounted to \$40,000. Dividends could have been declared, but it was decided to spend the surplus in improvements. The company owns a ranch of 1200 acres at Watsonville, all of which have been sown to beet cultivators. A very large crop of beets is expected for this year. A railroad is being continued from the ranch to Salinas City, which will go through a beet-raising country.

A GOOD USE OF ALLIGATORS.—Louisiana planters are finding that the slaughter of alligators has allowed muskrats, the great enemies of levees, to increase at an alarming rate. South Florida people have discovered that the rapid decrease of alligators in the peninsula has been accompanied by a corresponding increase in the muskrat, the most venomous of American snakes, and the alligator's choicest food. The saurian isn't pretty, but he is a friend of humanity, nevertheless.

THE CABLE RAILWAY INVENTION.—The Mechanics' Institute committee appointed to report on the testimonial to be given A. S. Hallidie, inventor of the cable railway, and the first to operate a cable line, has decided to express its appreciation of the value of the invention by spreading commendatory resolutions on the minutes of the Institute and sending a properly engrossed copy to Mr. Hallidie.

A LARGE flow of natural gas was struck in the southern part of the city of Stockton. The well is down 1700 feet, and boring is continued. The present flow of gas is 35,000 feet per day. The new granite courthouse is being heated with natural gas from the county's well with perfect satisfaction.

USEFUL INFORMATION.

A SILENT PIANO is one of the latest inventions. Its object is to do away with the torture inflicted on those who are compelled to listen to the strains of that instrument as invoked by beginners who are learning to make a better use of that valuable instrument. Efforts in this direction have been attempted by covering the instrument with plush or leather which would at the same time lend itself to ornamental effects and considerably reduce the volume of sound. The latest invention, however, is called a "pianophone," and is designed to meet the wants of students of keyboard instruments, by allowing them to practice scales and exercises without interfering with the convenience of involuntary listeners, while still able themselves to hear the results of their performance. It consists of a simple but effective striking action, and the substitution of metallic plates for the ordinary strings, acoustically tuned to the ordinary scale, and yielding sufficient sound to make the playing on the instrument distinctly audible to the player, and even (as in the case of the "silent violin") a source of pleasure to him, while it is inaudible at any distance—such, for instance, as an adjoining room. One great advantage is that the instrument never gets out of tune, and it is easily moved from one place to another.

A USEFUL INVENTION.—An automatic machine which forms, fills, weighs and seals packages is being introduced into factories where large quantities of fine-cut tobacco, soda, starch, etc., are put up. The operations of the machine are curious and novel in every particular, and yet quite simple. The machine consists of a series of forming blocks, receptacles, folders, gammers and feeders, all working in harmony, so that the packages are being smoothly and continuously produced. The forming blocks successfully size the paper, which instantly afterward is wrapped around them, folded and gummed at the end. The paper sacks are then plunged into receptacles, filled, folded on top and sealed. The manifest saving in labor thus effected would seem to warrant the claim of the inventor that if the machine is worked to its full capacity it will pay for itself in 275 working days.

DAMAGED EGGS.—It is an interesting fact that local commission merchants are selling cold-storage warehousemen because about \$12,000 worth of eggs were stored for them during March, April, May and June last year, but owing to carelessness, the apartments where the eggs were stored became filled with the odor of ammonia and other chemicals, permeating the eggs and destroying their market value. The same end for represent the difference between the price which the eggs in good condition would have brought and the actual sums for which they were sold. The "fresh egg" surely has many ills besetting it, and, according to the allegations of the merchants, their eggs might as well or better have remained under the barn or alongside the strawstack as to have been treated as they were.

SOLDERING METALS TO GLASS OR PORCELAIN. M. Callietet has devised a simple method for connecting glass tubes to metal work in the construction of physical apparatus, says *Industries*. The end of the glass tube is first gently warmed and then covered with a few drops of a solution of neutral platinum chloride and camomile oil. On gently warming the tube to a dull redness, the platinum salt is reduced to the metallic state and a brilliant deposit of the metal is formed on the end of the tube. The tube is then connected to the negative electrode of a battery and immersed in a bath of copper sulphate, when the copper is deposited as a malleable adherent coating on the platinum flux, and thus forms a material which can be brazed on to brass or copper in the ordinary way.

HOW TO CLEAN RUBBER SHOES.—A correspondent of an Eastern journal says there is a homely fact that people ought to know in these days, when we are getting a taste of an old-fashioned winter, so that rubber shoes are in frequent requisition by all classes. He wishes to make it known that the easiest way to clean rubber shoes of any kind is to rub them with vaseline. They then clean much better and last longer than if they are washed with water.

TO CURL FEATHERS.—After the curl has come out of them by washing the feather or getting it damp, place a hot flatiron so that you can hold the feather just above it while curling. Take a bone or alver knife, and draw the fibers of the feather between the thumb and dull edge of the knife, taking not more than three fibers at a time, beginning at the point of the feather and curling one-half the other way. The hot iron makes the curl more durable.

PRESSED PAPER PULP has been suggested for railway ties. The various uses to which this material has been put since the introduction of the wood-pulp process gives rise to the suggestion. There seems to be no good reason why it could not be put to this use.

HENS worth \$2000 apiece attracted curious sightseers at a recent poultry show in New York.

ENGINEERING NOTES.

WATER-POWER OF LAKE SUPERIOR.—Col. Hope of London, says the *Canadian Manufacturer*, has organized a company for utilizing the enormous water-power of Lake Superior and constructing very extensive works in the vicinity of Sault Ste. Marie. The waters of Lake Superior fall at the Sault about 30 feet to the level of Lake Huron, and the velocity has been recorded by Gen. Powell of the United States service as a little more than 90,000 cubic feet a second. Col. Hope, who has just returned from spending several weeks on the spot, made careful and accurate measurements and calculations, and finds the actual velocity and volume of water to be equivalent to 236,000 horse-power. His company intend to build a tail-race five miles long on the Canadian side and a canal five miles long on the American side. These canals will be each 1000 feet wide, the widest in the world. They will construct large drydocks on both sides, to be filled and emptied by gravitation. They will be the only drydocks in the world filled and emptied by this method. On the Canadian side all the principal works will be above the rapids, and on the American side below the rapids. The reason of this is that the land for factories and mills is furnished on the Canadian side above and on the American side below the rapids. There will be blast furnaces and shipyards, and it is expected that there will be paper-mills, pulp-mills, flour-mills and other industries, whose motive-power will be supplied by this company or by one of the several subsidiary companies which it is the intention of Col. Hope's company to form.

TO CONNECT THE LAKES WITH THE OHIO.—There seems to be no end to the proposition of new and important engineering enterprises, and the wonder is that their possibility and commercial value have not before been brought to public notice. The large concentration of capital and the necessity of seeking new avenues for its profitable investment no doubt have much to do with these activities. One of the latest propositions in this connection is that connecting the waters of Lake Erie with the Ohio river. The commission appointed to consider the feasibility of this plan reports that it is entirely feasible and comparatively cheap, the water supply being found ample and the grades offering no serious impediment to the work. With the Lake Erie and the Ohio river ship canal constructed and the canal from Buffalo to Albany enlarged to the same dimensions, a chain of inter-waterway communication would be established between New York and New Orleans. Its importance would not be greater commercially than from a military point of view in giving control, for defensive purposes, of the lake front, and in furnishing safe communication between New York and New Orleans and all interior points.

A GIANTIC ENGINEERING SCHEME.—It is seriously proposed to connect three cities—New York, Jersey City and Brooklyn—by tunnels. Articles of a corporation to do the work have already been filed. Four tunnels, large enough for two ordinary and two express trains, are to be constructed, by which not only the three cities named will be connected, but the different surface railway systems of the cities will also be connected. Enormous elevators will lead to commodious passenger and freight depots under ground, thus solving for all time the question of continuous and steady transportation at all hours for freight and passengers in the metropolis. The directors of the new company are all well known in commercial and financial circles. The capital stock is \$5,000,000. The tunnels will be made wide enough for the tracks to be built in the very best manner and delivered ready for use for not to exceed \$1,250,000 per mile. This does not cover, however, the cost of anything but the tunnel itself. The cost of excavation for underground stations, switches, real estate for surface stations, plants for ventilation and lighting, and equipment will have to be added to this cost.

LOCOMOTIVE TOWAGE FOR CANALS.—In Germany, experiments have recently been made with small locomotives for towing heavy boats on canals. Instead, however, of attaching the rope to the locomotive, it is attached to a heavy towing-car, which is drawn by the locomotive. The plan is said to be satisfactory.

A GREAT ENTERPRISE.—The construction of the great reservoir which is to supply Bombay with water is one of the most important engineering works of modern times. The dam will be two miles long, 118 feet high and 103 feet wide at the base. On the top of this big dam is to be a roadway 24 feet wide.

THE CUNARD LINE has contracted for two fast ocean racers of 12,000 tons each, capable of making the trip from Liverpool to New York in five days and eight hours. They will cost \$2,000,000 each, and be ready in 1892.

A SUBMARINE TUNNEL from Long Island to Staten Island has been authorized by Congress. The bill was signed by the President on Feb. 14th. Erasmus Wyman is at the head of the enterprise.

GOOD HEALTH.

INFLUENCE OF THE WIDTH OF STREETS ON PHTHISIS.—According to an American contemporary, remarks the *London Lancet*, Dr. Anders has been making certain inquiries in Philadelphia as to the influence of the width of streets on the mortality from phthisis, the wastage away of bodily tissue, and as the result of examining into the localization of 1590 deaths, he has arrived at the conclusion that the number of phthisis deaths is smaller in proportion to the population in wide streets than in narrow ones, and that in narrow streets the mortality is greatest where they are long, or where they form cul-de-sacs; in other words, complete movement of air about dwellings is a point of great importance in connection with the question of pulmonary phthisis. It is on this principle that all modern by-laws as to open space about houses are based, and it is as important to have wide, open spaces behind houses as well as in the streets in front, so as to secure a proper thorough current of air. There is, as a rule, not much difficulty in getting a reasonable width of street in the case of newly laid out areas for building, but there is a constant tendency to put an undue limit on the needed area behind dwelling-houses, although this is a matter of the first importance as regards the promotion of health and the prevention of a certain class of diseases. The observations from Philadelphia deserve the consideration of such sanitary authorities in this country as have not yet acquired proper control over the open spaces to be provided about new domestic buildings.

A WARNING TO DOG OWNERS.—Professors of canine pets will do well to take warning, says the *London Lancet*, from certain recently reported observations of Prof. Nothnagel. These go to prove that the development of cysticercosis in the human subject is in some cases to be attributed to contact with the saliva of lap-dogs which have been allowed to lick the faces and mouths of their owners. The explanation is a feasible one, and adds a noteworthy contribution to our knowledge of morbid etiology. The *taenia echinococcus*, as is well known, inhabits the small intestine of the dog, and it is highly probable that the ova occasionally find their way into the animal's mouth; for example, in vomiting. There are various æsthetic reasons why the kiss of even the most cleanly and most friendly pug or terrier should be dispensed with. We have now, thanks to the Viennese observer, a still stronger argument to urge against this practice. It may, indeed, like the others, fail to daunt the too-devoted master or mistress, but we cannot do less than avail ourselves of this opportunity to forestall, if possible, by a timely warning, the sharper teaching of experience.

HOW VARIOUS NATIONS SLEEP.—In the tropics men sleep in hammocks or upon mats of grass. The East Indian unrolls his light portable charpoy or mattress, which in the morning is again rolled together and carried away by him. The Japanese lie upon matting with a stiff, uncomfortable wooden neck-rest. The Chinese use low bedsteads, often elaborately carved, and supporting only mats or coverlets. A peculiarity of the German bed is its shortness; besides that, it frequently consists in part of a large down pillow or upper mattress, which spreads over the person and usually answers the purpose of all the other ordinary bed-clothing combined. In England the old-fashioned bedstead is still the pride of the nation, but the iron or brass bedstead is fast becoming universal. The English beds are the largest beds in the world. The ancient Greeks and Romans had their beds supported on frames, but not flat like ours. The Egyptians had a couch of a peculiar shape, more like an old-fashioned easy-chair with hollow back and seat.

CURING COLDS.—A contemporary gives the following suggestions for curing colds: 1. Bathe the feet in hot water and drink a pint of hot lemonade. Then sponge with salt water and remain in a warm room. 2. Bathe the face in very hot water every five minutes for an hour. 3. Snuff up the nostrils hot salt water every three hours. 4. Inhale ammonia or menthol. 5. Take four hours' active exercise in the open air. A ten-grain dose of quinine will usually break a cold in the beginning. Anything that will set the blood actively in circulation will do it, whether it be drugs or the use of a brook-saw. The following has been tried with very beneficial results for cold in the head: One teaspoonful of mustard dissolved in a tumblerful of cold water, and used as a gargle three times a day, will often effect a speedy cure. In more obstinate cases, equal parts of castor oil and pulverized alum, used as snuff, it is stated, will give instant relief.

The use of glycerine on a dry skin does not agree with it.

RAMIE.—The California Ramie Co. has incorporated. Directors—William and R. Lichtenberg, William H. Murray, H. Francis, Arnold Becker, J. W. Lucas and Joseph F. Forrester. Capital stock, \$100,000, of which \$75,000 has been subscribed. Its object will be the cultivation of the ramie plant, reeling its fiber and preparing the same for market.

ELECTRICITY.

The Marvel of the World.

The electric spark has kindled a fire of enterprise which burns with a most steady and increasing force. It was a mystery at its start and it continues a mystery to-day. It was first discovered by our Franklin, as it sprang from its lair in the clouds. The studies and suggestions of that great philosopher soon taught men how to cause it to curb its violent course and to run peacefully along an artificial highway to its quiet home in the earth.

The possibility of capturing and taming this hitherto violent agent soon suggested itself to inquiring minds, and we next find it disciplined, directed and controlled, and made perfectly subservient to the will of men—a peaceful and quiet laborer in the fields of industry. Until 10 or 15 years ago the only use made of it was in feeble currents running along a slender wire simply carrying the thoughts of its captors by telegraph or telephone.

Since then what a change has taken place! At the bidding of science this wonderful and mysterious agent, so terrible in nature, so tame and obedient to its new-found master, is now as completely under control as is the ponderous steam hammer which will simply crack a nut or weld into shape the heaviest mass of iron which is employed to propel the most powerful ocean steamer! Even in its most terrible manifestation of power it can be localized or at will sent quietly along a tiny rod of metal to exert its tremendous power miles away wherever it is directed. Its light is employed to illumine "my lady's bonnet" with the mildest rays which should fall upon the face of beauty, or burn with the most vivid brightness from our beadlands and capes to warn the storm-tossed mariner of a dangerous coast.

It annihilates both time and space or stands a quiet sentinel at the street corner. Every morning it hings to the "autocrat of the breakfast-table" the news of the world as collected and condensed by hundreds of busy minds in every part of the globe. In its speedy work it spans continents and traverses ocean depths as though they were here of space and continuity. Its home is in the heavens and upon the earth. It comes and goes at our bidding with the mighty force of the elements or like the gentle fanning of a zephyr. Its workshop is the universe. Its entity is as unknown as the secret of the Sphinx. The story of its installment as an industrial force is one of the romances of history, and no legend of olden times or sober statement of modern facts is at all on a par with its wonderful accomplishments or rapid development.

THE ECONOMY OF LARGE DYNAMOS. It is said, will not come in their first coat, but in the expense in running them after installed. A 400-horse power generator will cost to manufacture twice as much as a 200 horse power machine. About twice as much material will be put in the former as in the latter, unlike a steam-engine, but there will be a saving in winding the fields and armatures. The larger casting and a greater difficulty in finishing the base and other casting pieces will make up to an extent that which will be saved in winding the fields and armature. After the machines have been installed and put into operation, comes the saving. Less care and consequently labor will be required to keep them running properly, and as the speed will be materially lower, averaging from 300 to 400 revolutions per minute at their maximum, the possibilities of burning out an armature are much reduced from what they would be with an 80-horse power generator, whose armature makes from 700 to 800 revolutions per minute.

A WOMAN'S DEVICE.—Mrs. Mary Lowell is known as the "Electrical Star," according to the *New York Press*, and lately turned her love for electrical engineering to practical account. She was without a servant, and determined to try whether she could not light the kitchen fire by means of a flash of electricity, and then let it burn up before she got up herself. She prepared wires to and from her head to the kitchen grate, and with the aid of a small battery, all that remained to be done was to so "build" the fire that the materials should become more easily ignitable. In the morning, the current was sent through the wires, and when she descended to the kitchen the kettle was boiling. She thinks she has done something toward the solution of the servant-girl question.

ELECTRICAL BLEACHING does not appear to have been the success which was promised, says the *Textile Recorder*, but inventors are not deterred from patenting modified processes. The last is from St. Petersburg, and is for an electrolytic method for preparing a liquid suitable for bleaching tissues and paper pulp. It consists essentially of passing an electric current into a solution of common salt mixed with caustic lime. It is supposed that there is formation of hydrochlorite of lime and hydrate of soda, by which the bleaching process is effected.

THERE is to be a food and health exposition held in New York in March, its projectors wishing to teach the lesson that if people had proper food far less money would be needed for physicians and hospitals.



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W. B. EWER.

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[NEW THIS ISSUE.]

Mining Machinery.—Joshua Hendy Machine Works. Silver-Plated Amalgam Plates.—E. G. Denniston. Ventilators.—Eureka Ventilating Co. Gas and Gasoline Engines.—Electric Vapor Co. Delinquent Sale Notice.—Oray Eagle Mining Co.

See Advertising Columns.

Passing Events.

The question of ore rates on railroads is a very important one to many mining districts. They have had difficulty in this connection in Idaho and Montana, and now Utah is worried over a proposed advance of \$3 per ton from Park City to Denver and the Missouri river. The mining men at Salt Lake are vigorously protesting.

Some of the mining counties of this State are commencing to think of preparing suitable exhibits for the World's Fair. Both Nevada and Placer counties will consider the idea of sending a 1000-pound brick of native gold.

Quite an activity is again apparent in the local mining share market, and some sharp advances have been made in certain Comstock securities this week.

The danger of the closing of the State Mining Bureau by the Legislature is past, and it is probable that the institution will have an appropriation of \$50,000 this year.

Grass Valley has another dividend-paying mine on its list in the W. Y. O. D. claim, which this week announces its first dividend.

Mining Bureaus.

The California State Mining Bureau did not fare so well at the hands of the Legislature this session as it did last, when an appropriation of \$100,000 was made. Last week the Assembly gave it \$40,000 in the General Appropriation bill, but the Finance Committee of the Senate has raised this to \$50,000, which will probably be the amount. While this cannot be said to be a liberal appropriation, it is more than the Bureau has ordinarily had until last session. In fact, the friends of the Bureau can well be satisfied in view of the opposition to State Commissions, for even the abolition of this, among others, was advocated by some members.

A disposition was manifested to cut off field work and confine the efforts of the Bureau to its museum department. The truth of the matter is, however, that the main practical value of such an institution to the mining public is its field work. The museum is well enough in its way and serves a useful purpose as an exhibition of minerals or mineral products, but as far as actual miners are concerned, they care very little about this. What they want a Bureau to do is to bring their districts and mines before the people, inform them as to the methods of beneficiating their ores, and gather and publish such facts as are of daily use in their business.

While the last report may be open to the suspicion of some little "padding," perhaps, and some portions—notably that on mining laws—should have been more carefully edited, on the whole it was creditable, several chapters being of special value. Of course if field work is cut off, the next report must consist mainly of a catalogue of donations to the museum.

But while we have the only Mining Bureau in the mining States, the others are now organizing them. Washington has now a State Geologist, who has just issued his first report. Montana and Utah are both about to start mining bureaus. The bill to establish a State Mining Bureau in Colorado has been favorably reported, and, we are informed, is very sure to pass, so there will soon be a Mining Commissioner there. Under these circumstances, we will soon have mining and metallurgical literature in quantity, so no one need suffer from lack of information on these subjects.

The Mines of Washington.

We have received the first annual report of State Geologist George A. Bethune, of Washington, who has, since his appointment a year ago, inspected every mining district, every mine of promise or prospective worth, and every industrial enterprise horn of the mineral developments of the State. The report is a very useful and interesting one. It gives a history of the placer and quartz discoveries of Washington; chapters on the coal and iron; analyses, descriptions of the metallurgical works, points for prospectors and descriptions of various mines and districts.

It seems from this report that to Washington is due the distinction of being the first division of the Union in which gold was discovered north of California on the Pacific Coast. This was on the Similkameen river in what is now known as Okanogan county, in 1859, when the boundary commission was at work. This just preceded the Fraser river excitement which shortly drew all the men off into British Columbia to that famous region. Discoveries were also made in 1874 in what is now Kittitas county. The more recent discoveries of placera date from the year 1881, when the Cle Elum placera were found.

The first quartz was found by Hiram F. Smith on July 4, 1871, on the "Moses reservation," now in Okanogan county. It was at the base of Mt. Chapaka, where the district was formed, and where many miners came. Hardly had the work of development commenced before the soldiers made them leave the reservation. To this fact is ascribable the reason why, when found as far back as 1871, these valuable mines remained practically unheard of until as recently as the last four years after the Moses reservation was restored to the public domain. Ore was found in 1878 on the Peschaetin river by C. P. Culver. In 1881 the Cle Elum district was discovered, and in 1883 the first gold and silver bearing ores were found in Colville district, but it was not until 1885 that the district was brought into prominence.

Water Supply of Cities.

The Citizens' Committee of One Hundred of Oakland sent out, some time since, a number of circulars to the larger cities of the United States with a view to obtaining information as to their water supply. The questions asked were as follows:

1. Is your water supply drawn from wells, lake or stream?
2. Is water furnished you by a corporation, or does your city own the plant?
3. If water is furnished by a corporation, by whom and how often are the rates fixed?
4. If water is furnished by a corporation, what arrangements have you with them for furnishing water for public use, viz: street sprinkling, Fire Department, public buildings, etc?
5. If your city now owns its plant, but water was formerly furnished you by a corporation, what was the chief cause or causes that brought about the change?
6. Does your water require filtration, and, if filtered, by what process?
7. What proportion of your consumers use meters?
8. If city owns plant, is it a source of profit or expense?
9. Do your people appear to be satisfied with your present water service?
10. Can you send us list of rates charged or any other literature on the subject?

In response to this circular letter issued by Recording Secretary J. W. Dutton, answers were received from 172 cities, and with these answers came a mass of information pertaining to the subject, in the form of letters and reports, all of which have been carefully compiled by Prof. Frank Soule, of the State University, Corresponding Secretary of the Committee.

This compilation has not yet been published, but the following is a brief summary of the facts and figures contained in the manuscript copy now in the possession of the Committee of One Hundred.

SUMMARY.

No. of cities answering questions of committee.....	172
No. of cities owning their own water works and water service.....	120
Of these, satisfactory.....	105
Unsatisfactory (on account of quality of water).....	8
Not stated.....	7
No. of cities in which water works were controlled by private corporations.....	53
Satisfactory.....	22
Unsatisfactory.....	30

The reports from 162 cities in the East where water-meters are used are as follows:

Average minimum price per 1000 gallons.....	94c
Average maximum price per 1000 gallons.....	25c

IN OAKLAND.

Average minimum price per 1000 gallons.....	30c
Average maximum price per 1000 gallons.....	65c

In 162 Eastern cities the following are the average annual rates:

Dwellings, one family.....	\$6 35
One bath-tub.....	3 44
One horse.....	2 04
One water-closet.....	3 70
Lawn, 60x120 feet.....	1 35

In Oakland the annual average rates are as follows:

Dwellings, one family.....	\$27 60
One bath-tub.....	6 00
One horse.....	6 00
One water-closet.....	4 20
Lawn, 60x120 feet.....	39 96

Other items bear the same general ratio. Except in case of replies from private water companies themselves, the opinion is unanimous that the city should own the water works and control the service through a Board of Water Commissioners.

Since the compilation of these figures, the City Council of Oakland has reduced the rates of the company slightly, especially in the case of smaller dwellings. But in the opinion of the citizens, the rates still continue much too high. The same condition exists in a number of other towns in this State.

Assayers' Manual.

We have received from Henry Carey Baird & Co., of Philadelphia, the second American edition of the "Assayer's Manual," an abridged treatise on the doctimate examination of ores and furnace and other artificial products, by Bruno Karl. The new volume has been edited with extensive additions by F. Lynwood Garrison of Philadelphia.

While there has been but little improvement in the old fire assay methods, the advancement in wet and particularly electrolytic methods has been notable. In this particular the editor has drawn largely from a German work of Baling. A somewhat lengthy article on the dry assay of iron ores appears in the appendix of this work. The object of the "assayer's manual" is to give directions for executing doctimate tests of natural and artificial products by methods taken mostly from practice, and which are of interest especially to metallurgists and also to other technologists. The book comprises some 350 pages, and has a number of illustrations. It is clearly and plainly written, and a very useful work for any one interested in assaying any kind of ores.

Gold Bullion for Export.

To prevent gold going out of the country, Congress recently passed a law by which it is necessary to pay four cents on every \$100 worth of gold bullion for export. It has been customary to obtain good new coin or bars for export, but now they must take the coin just as it runs, abraded or not, unless a special charge is paid. The superintendent of the U. S. Assay Office at New York has received instructions from the Treasury Department authorizing him to place a charge on gold bars sufficient to pay the cost of manufacture. This cost is to be at the rate of four cents for every \$100 worth of gold, and the charge will be imposed on the gold now ordered for shipment.

It is, however, the opinion of Superintendent Mason that this small addition to the cost of gold will not be sufficient to check the exportation of the precious metal from this country when the commercial needs of other nations require such shipments and the rate of exchange permits them.

The British mints place a manufacturing charge on gold handled therein, but this has not prevented the United States from getting the gold when it was wanted and became profitable to import it. The only way the Bank of England can keep gold in that country is by advancing the rate of discount, making money so valuable there that it would not pay to export it.

The Associated Banks in New York have practically the same power if they choose to exercise it. By refusing to make discounts at low rates, the money would become more valuable at home than if sent abroad.

Cleaning Plates.

EDITORS PRESS:—I have been for some years a subscriber for the MINING AND SCIENTIFIC PRESS and would like you to give me some information about cleaning quicksilver. What is best to clean it with and not injure your plates?
J. H. S.

Deadwood, Siskiyou Co.

Mr. Denniston, the manufacturer of silver-plated amalgamating plates, gives preference in cleaning these plates to a weak solution of cyanide of potassium or a strong solution of salt and water, using a brush with each.

To insure good amalgamation, the plates must be kept clean and bright. Grease or oil of course prevent proper amalgamation. The presence of these deleterious substances should be carefully avoided, and if present must be counteracted by the introduction into the battery of a saturated solution of wood ashes. Cyanide of potassium in dilute solution is used to promote amalgamation, but the practice of using the cyanide is less common than formerly. One or two pounds will be sufficient to clean the plates of a 40-stamp mill for a year.

Some people use a solution of vinegar and salt for cleaning plates. Very dilute nitric acid is also used, the plates being at once rubbed with quicksilver after being washed with clear water.

The quicksilver itself is carefully washed and strained through a canvas bag to remove as many impurities as possible and again strained. On a small scale it can be strained by hand through a chamois bag. Of course the quicksilver, when it becomes dirty or mixed with foreign substances, must be retorted at a low temperature to thoroughly clean it.

CO-OPERATIVE EXPOSITIONS.—Two of the principal officers of the Portland (Oregon) Industrial Exposition, E. A. King, vice-president, and R. W. Mitchell, secretary, are in this city urging co-operation on the part of the Mechanics' Institute Exposition managers. It has been found that it is difficult to secure Eastern attractions of a novel character for a single exposition of four or five weeks. With two expositions, one following the other and located at different yet not conflicting points, many new features could be obtained.

THE Tacoma smelter last month turned out bullion valued at \$51,551, of which \$32,043 was silver, \$13,181 lead, and \$6326 gold. The smelting company employs 64 men, and the pay-roll for the month was \$3476.

THE Hale and Norcross Mining Company re-elected its old Board of Directors, consisting of H. M. Levy, A. K. P. Harmon, M. Hoeflich, Joseph Marks, John F. Eagan, J. B. Low and H. S. Wheeler.

Amalgamating Gold.

In describing the Idaho mill and the Grass Valley method of working gold quartz, Eggleston in his work on the "Metallurgy of Gold, Silver and Mercury in the United States," has engravings of the Attwood amalgamator and the Eureka rubber. The mill uses eight Attwood amalgamators and seven Eureka rubbers, twenty-one blanket sluices, four Knox pans and two huddle concentrators. The pulp goes from the battery into a splash box which discharges into a trough to distribute the pulp over the blanket sluices. The sluices project over a trough which connects with another five feet long, there being one for each set of two batteries on one side of the mill and four on the other, which is 18 feet long and 13 inches wide. These are filled with copper plates and discharge on a Eureka rubber.

From the constant washing of the blankets a considerable amount of material collects in the bottom of the vats used for that purpose, and when the solid material has accumulated and of proper consistency to be handled by a shovel, it is charged into an Attwood-amalgamator feeder *p*, shown in the cut. This exceedingly simple machine is shown in section and perspective in the cuts. It consists of two wooden troughs *a*, 14 inches wide, 6 inches deep and 19 inches long, which are semi-circular in shape, holding from 350 to 400 pounds of mercury each. Over the mercury a cylinder of wood *b*, 8 inches in diameter and 18 inches long, is made to revolve.

The circumference of this cylinder is divided into 12 equal parts and its length into 18. Commencing at each end with a half division, iron

automatic feeder is arranged on the top frame of the amalgamator.

The wheels *c* and *f* communicate motion to an arm *g*, which communicates with an iron lever *h*, bent at right angles and hinged at the angle. The end of this arm, to which *g* is

placed in any position in the box *p*. The screw and ratchet are regulated so as to move just fast enough to wash the pulp out of the feed-box.

The blanket washings are charged in the back of the feed-box *p*, which is 18 inches wide,

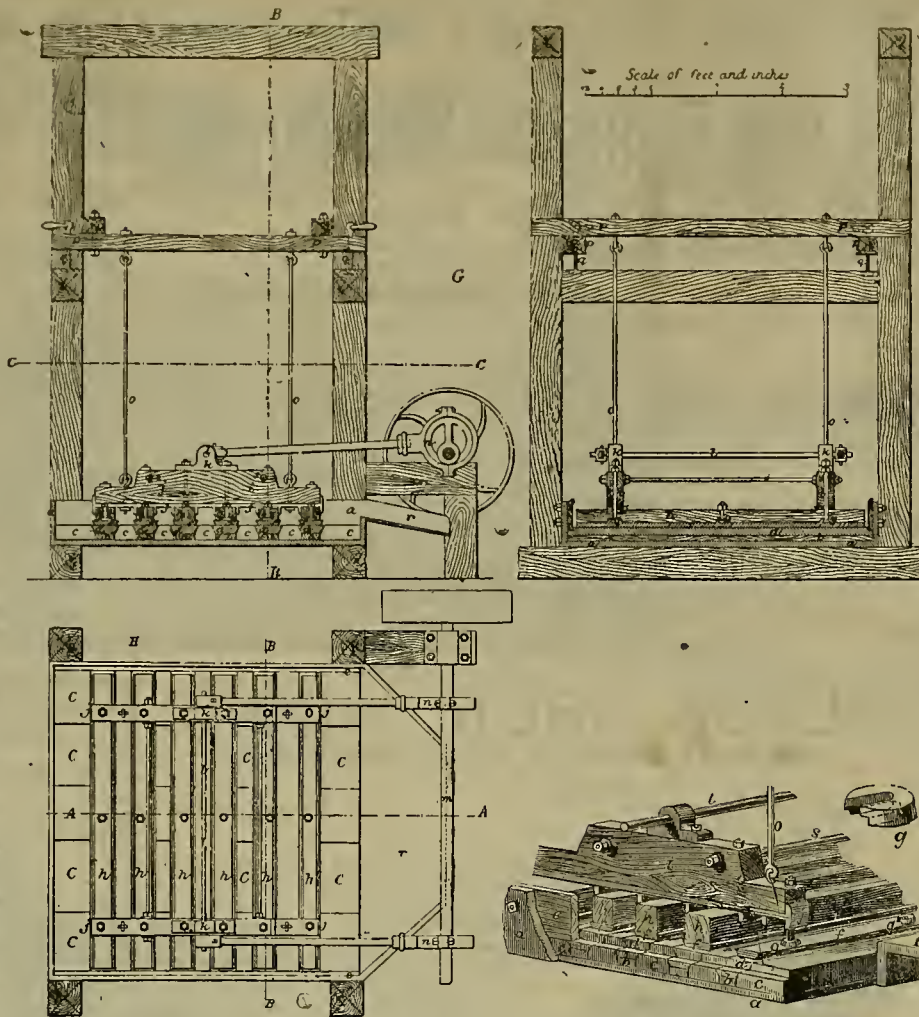
rifles, will sink to the bottom. The gold, except that contained in the pyrites or attached to small particles of ore, will be caught by the mercury of the haul or rifles, while the constant agitation of the rods on the wheels *b* will tend to keep the lighter particles of poor material in suspension. As the material which passes through this machine is the most valuable part of the ore, great care is taken, not only that the pulp shall be evenly and constantly fed, but also that the surface of the mercury is kept bright. Both that in the hauls under the wheels and in the rifles is continually watched, and cleaned as soon as its surface is no longer quite bright. These skimmings are put on one side for after-treatment. The success of the mill depends in a great measure on the care with which this work is performed. The automatic feeder does not need much watching. The water feed-pipe *e* occasionally gets stopped or impeded in its motion, but the mercury requires constant attention. Most of the gold in the mill is caught in this machine.

The object of the Eureka rubber is to clean any rusty gold; to rub off by friction any slime which may have attached itself to it, or to brighten the gold in milling operations so that it may more easily amalgamate. This rubber is used in many gold mills in this State and elsewhere.

The rubber (see cuts) is made of a cast iron box *a*, 1½ inches thick and 56 inches square and 7 inches deep, into which a false bottom 2½ inches thick is placed. This false bottom is made up of three parts: The dies *c*, made of soft wood, cut across the grain, which are 4 by 11 inches, and between which the wooden die bed-plate *b*, 3½ inches wide and 1 inch thick, and the whole width of the box is placed.

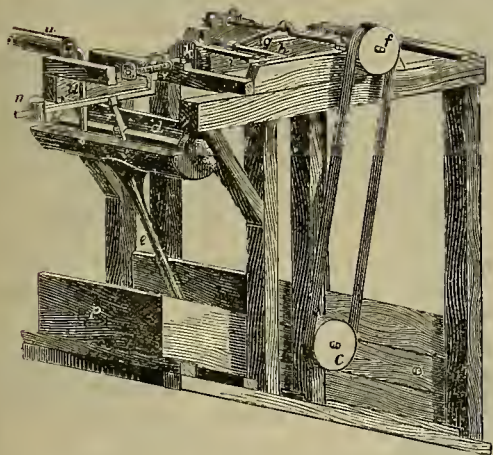
On top of this die bed-plate, the cast-iron dies *d*, which are 3½ inches wide at the bottom, 4 inches at top, and 2 inches thick, are placed, the object of the flare being to hold the under dies, *c*, in place when the surface begins to wear. The bottom of the box thus becomes a die, consisting of alternate strips of wood and iron, which are held firmly in their place by wooden strips, *e*, one inch thick let three-fourths inch into the dies and bolted to the side of the box. Over the die a wooden frame, *i*, held together by two bolts, *s*, is suspended from the top of the frame, *p*, by iron rods one-half inch in diameter. It is moved backward and forward by means of an eccentric, *n*.

To the bottom of this frame, cast-iron foot-plates *j* having six slots formed by flanges projecting 1½ inch to receive the wooden shoes, are placed. The wooden shoes *h* are 3½ inches wide and 2½ inches thick, and have iron shoes *f* 4 inches wide at the top, and 3½ inches at the bottom, and 1 inch thick fastened to them by means of sockets *g* (see perspective drawing) cast on them. Both the iron and wooden shoes *f* *h* have amalgamated copper plates at-



EUREKA RUBBER FOR CLEANING "RUSTY" GOLD.

SHOE AND DIE OF THE EUREKA RUBBER.



FEEDER FOR ATTWOOD'S AMALGAMATOR.

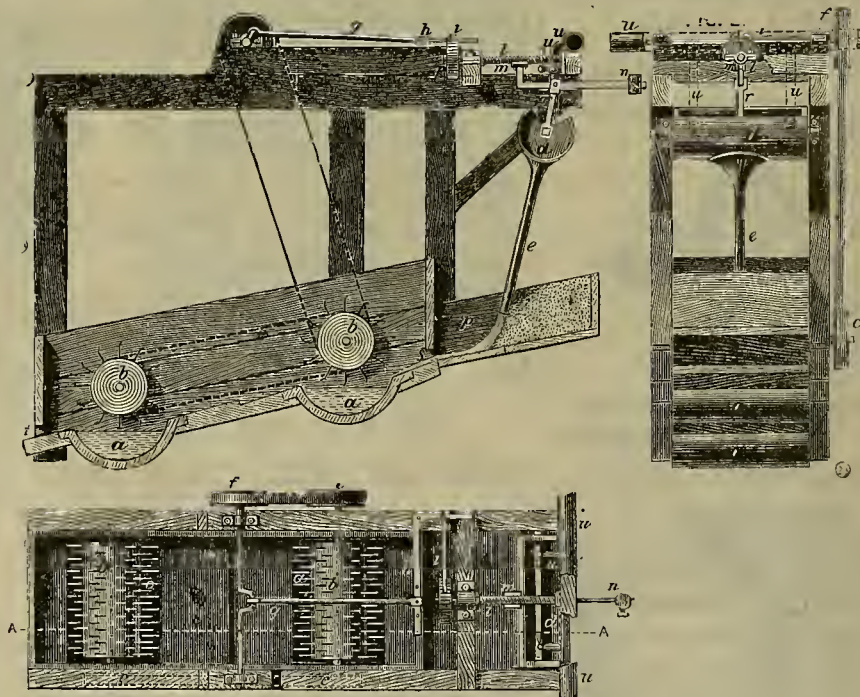
rods one-fourth inch in diameter and three inches long are set at right angles to the surface of the cylinder, but slightly curved at one end. They are set in quincunx, but do not touch the mercury, though they come very close to it. Two of these cylinders are set three feet apart and make 60 revolutions per minute.

The blanket washings are put in the charging-box *p*. As it is necessary that the pulp should be made to flow with the greatest regularity through the amalgamator, an ingenious

arrangement, has three holes to admit of a change of movement there, and to one of them a ratchet *i*, moving on the ratchet wheel *k*, is attached. This wheel is made to move forward, one ratchet for every revolution of *c* and *f*. Keyed on to *k*, and serving as an axis of rotation, is an iron bar *l*, with a screw-thread out of which a half nut *m*, kept in position by the counterpoise *n*, is placed; to the counterpoise lever the water feed-box is attached. By raising the counterpoise arm the pipe *e* can be

three feet three inches long and ten inches high. The pipe *e* is set so that the water will flow over the ore and wash it out into the amalgamator; it moves backward as fast as the ore is washed out. The water used for this purpose is heated to a temperature of 120 degrees to 130 degrees Fahr., as it is found that the amalgamator works better hot than cold. The washings pass through the first amalgamator, over the rifles, on to the second, and out at the discharge *t*. The heavy particles, as they pass under the wheels and over the

attached to them. The arrangement of shoes and dies is clearly seen in the perspective drawing. The rods *o* suspend the shoe frame from a movable frame *p* which is capable of adjustment by means of a screw *g* which allows the shoes and dies to be set at any distance. The eccentric wheel communicates the movement to the shaft *l* which goes across the top of the frame, makes 55 revolutions per minute, and gives a motion 4 inches backward and forward. The pulp from the Attwood amalgamator is discharged from a trough so arranged as to give an equal supply to each rubber; passing on to the rubber, it goes under the shoes and dies, and the bright surfaces are caught by the amalgamated plates,



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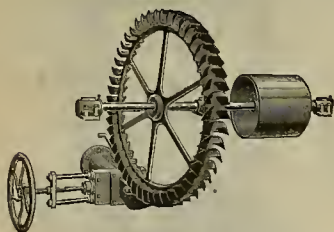
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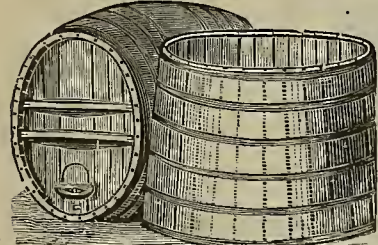
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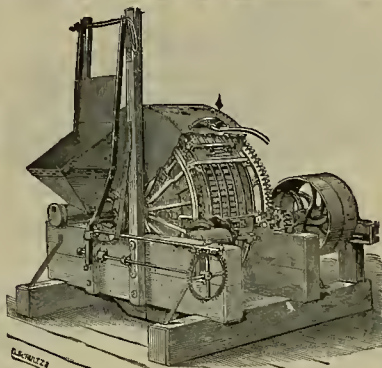
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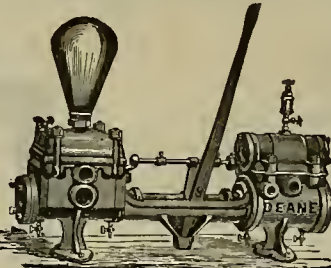
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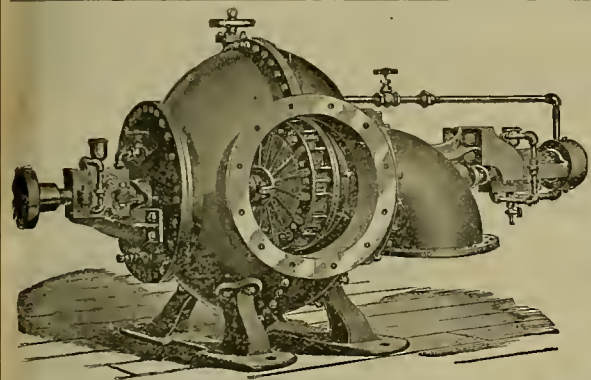
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Pacific Coast inventors have done much toward the perfection of motors of this class, particularly in the way of igniting the charge of gas and air by means of a small electric battery, the greatest difficulties to overcome being the constant burning out of the electrodes and consequent necessity of replacing them every day or two; and further, the leakage and frequent cleaning and overhauling required by the check-valves for inlet of gas and "poppet" valves for exhaust.

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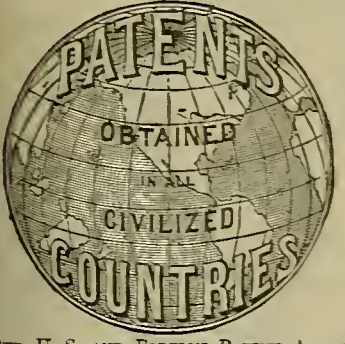
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Assessment Notices.

CRESCENT MILL & MINING COMPANY.

Location of principal place of business, San Francisco, California. Location of works, Crescent Mill, Plumas County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on Friday, the 28th day of February, 1891, an assessment (No. 5) of Twenty-five cents (\$25) per share was levied upon the Capital Stock of the Corporation, payable immediately in United States gold coin to the Secretary at the office of the Company, No. 319 Pine Street, Room 40, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of April, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 4th day of MAY, 1891, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors,
J. H. ISHAM, Secretary,
Office, No. 319 Pine Street, Room 40, San Francisco, California.

DELINQUENT SALE NOTICE.

GRAY EAGLE MINING COMPANY—Loca-

tion of principal place of business, San Francisco, California. Location of works, Placer county, California.

Notice is hereby given, that there are delinquent upon the following described stock, on account of Assessment (No. 22) levied on the 4th day of February, 1891, the several amounts set opposite the names of the respective shareholders, as follows:

Names.	No. Cert.	No. Shares.	Am't.
Barrows, A. W., Trustee.	353	271	\$ 4.13
Francis, H. L., Trustee.	444	1,500	45.00
Horton, I. R., Trustee.	365	2,500	75.00
Lane, Mrs. Sarah, Trustee.	383	250	6.00
Stout, C. S., Trustee.	477	953	28.59
Searles, W. A., Trustee.	315	1,000	30.00

And in accordance with law, and an order of the Board of Directors, made on the 4th day of February, 1891, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, Room 11, No. 303 California street, San Francisco, California, on MONDAY, the 30th day of March, 1891, at the hour of one (1) o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of the sale.

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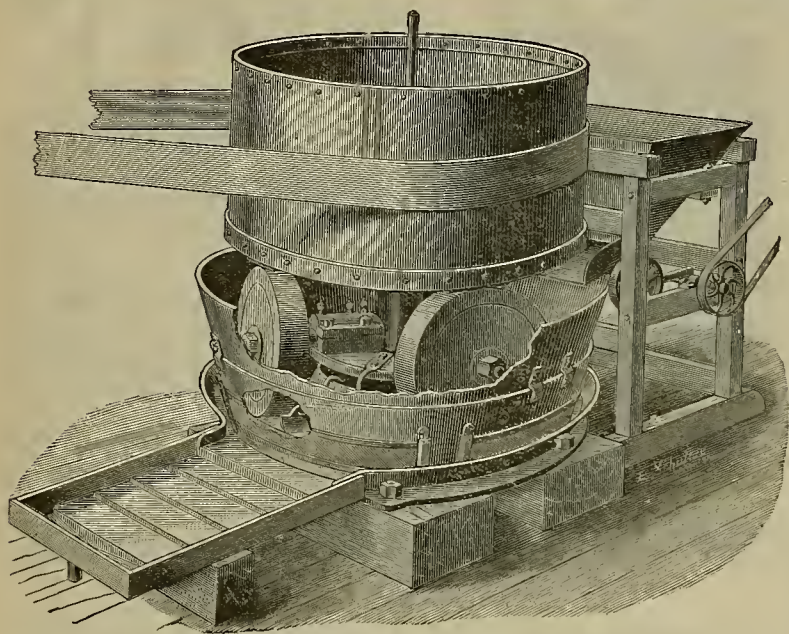
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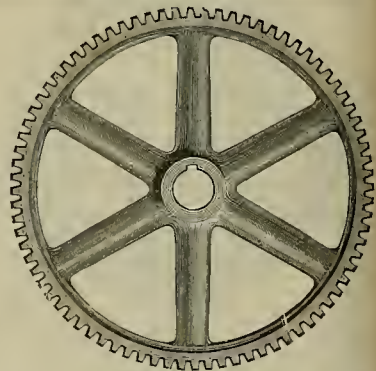
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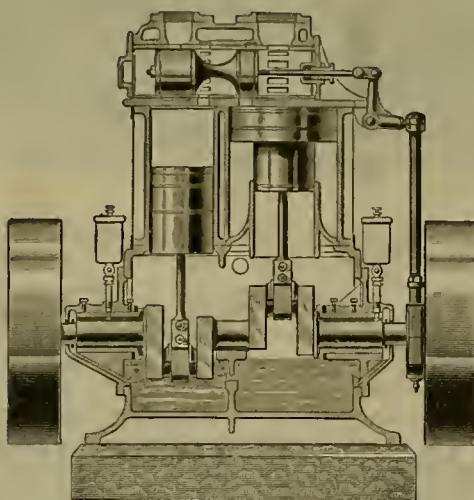
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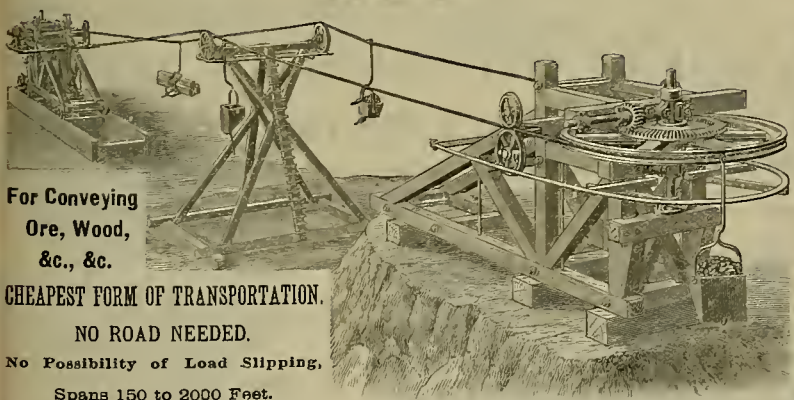
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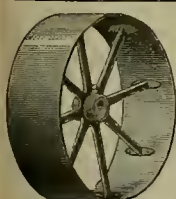
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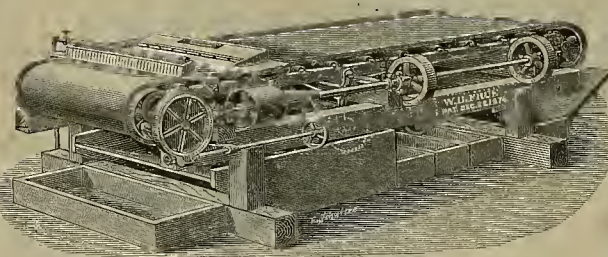
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Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

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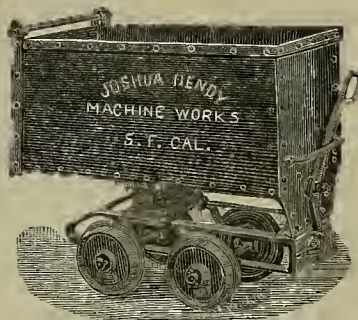
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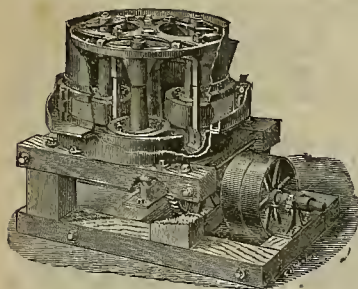
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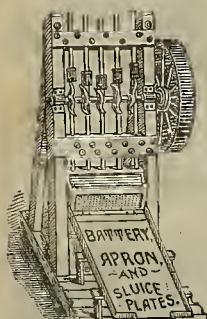
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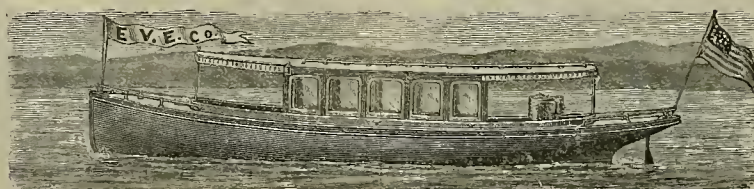
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VOL. LXII.—Number 12. SAN FRANCISCO, SATURDAY, MARCH 21, 1891. Three Dollars per Annum. SINGLE COPIES, 10 CENTS.

The Woodbury Ore Concentrator.

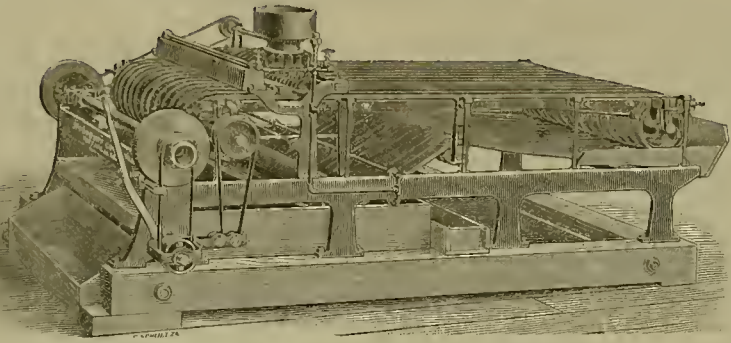
On this page are presented engravings of the Woodbury ore concentrator and of the improved concentrator belt used on the machine. To give this concentrator more capacity than those of the ordinary form, it is constructed to carry 13 narrow belts, and by dividing the pulp equally upon each belt, they prevent the pulp from running from one side to the other, or to in any way interfere with the working of any part of the pulp not allotted to its particular place. The belts are made perfectly smooth on the surface, the inventor believing that way of using belts is better for fine and close work than any corrugations. Corrugated surface belts can be used, however, if preferred.

The main frame of the concentrator is made of iron, giving it stability and durability. The main shaft is two-inch steel; the main boxes are self-oiling, and the connecting-boxes are large and self-oiling. It requires less than one-half the room in the mill of the ordinary machines, and it is claimed will run with much less power, water and attention.

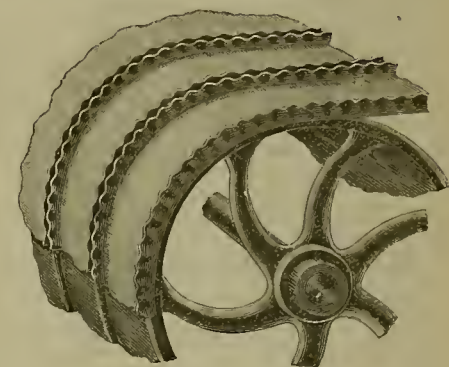
Mr. Woodbury states that this concentrator will work from 12 to 15 tons of ore, which is much beyond the capacity of the ordinary belt machine. The narrow belts run each on a separate crown on the roller, so that there is no possibility of their getting out of line, and no adjustment is required after they are once started. A revolving feed bowl distributes to each belt its exact proportion of sand, water, and sulphurets, thereby largely increasing the capacity of the machine.

The belt used is patented by the same inventor. It is constructed with edges corrugated for the purpose of elongating the edge at the top, and gradually diminishing toward the main part of the belt. This improvement prevents the edges from cracking, as the edges have only to straighten out and not stretch as they pass around the drums, and there is, therefore, no strain on the edges.

Mr. Woodbury says that this machine does not require an expert to run it. A man of ordinary intelligence can learn to do good work with it in a few hours. Forty-five of these machines have been put in operation in



THE WOODBURY ORE CONCENTRATOR.



WOODBURY CONCENTRATOR BELT.

the last 18 months, each in every case working for five stamps. The machine costs, shipped, \$575. George E. Woodbury, 213-217 Front street, in this city, is the inventor and manufacturer.

The "Vulcan" Wire Ropeway.

Valuable improvements have been made during the past few years in the details of wire ropeways for transporting ore, cordwood and other material. In mountainous districts, where roads are impracticable, the wire ropeway may be regarded as a necessity, as the contour of the ground offers no impediment—the ropeway "leaping from hill to hill," and often, unsupported, crossing chasms many hundred feet in depth. The Vulcan Wire ropeway system is an improved form, the details of which are the result of experience. The accompanying engravings show the construction of the improved ropeway.

An endless wire rope is supported at inter-

vals (varying according to the nature of the ground from 150 to 2000 feet) on grooved supporting sheaves which are secured to the ends of a cross-arm elevated on a suitable supporting structure or tower. The rope passes around horizontal grip-sheaves placed at each extremity of the ropeway and over the supporting sheaves. The grip-sheave is so constructed as to prevent the rope from slipping and is furnished with a suitable brake to regulate the speed. By means of the grip-sheaves power can be transmitted to or from the traveling rope.

To one of the terminal structures is attached a counter-weight that counterbalances the weight of the load carried, takes up the stretch of the rope, and likewise provides for any contraction or expansion of the rope, caused by change of temperature.

The conveyors or carriers (which vary in shape according to the character of the material to be transported) are loaded with about 125 pounds—the loading and unloading being done

while the rope is in motion. These conveyors are attached to hangers that are suspended from the projecting shafts of the clips which are inserted in the rope at suitable distances, to correspond to the quantity of material to be delivered per day.

Thus it will be seen that when the rope is set in motion it will carry with it the loaded conveyors at such rate of speed as may be determined most suitable, usually about 200 feet per minute. The conveyors are easily loaded or unloaded as they pass by, which can be done at any point on the line. These conveyors may be loaded automatically, if so desired. The unloading is always done automatically.

When the point of discharge is lower than the point of loading, equivalent to a grade of one in seven (or an inclination of eight degrees), the ropeway will run by gravitation. When the angle of descent is less than eight degrees, power of some kind must be employed to run the rope, and may be applied at any part of the line.

When the angle of descent is sufficient, there can be carried back to the mine, or to the head of ropeway system, various material, supplies, etc., or the surplus power may be transmitted, by suitable attachments, to mill machinery.

Fig. 1 of the accompanying engravings is a general view of the whole system. Fig. 2 is a supporting or station sheave and stand. Fig. 3 is a guide sheave and stand. These sheaves are made from 22 to 36 inches diameter, and if desired are furnished with metal line bushings, dispensing with the use of oil. The sheaves are

(Continued on Page 185)

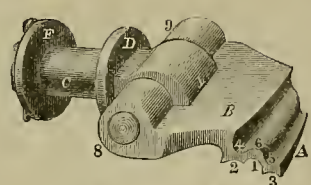


Fig. 4—THE CLIP.

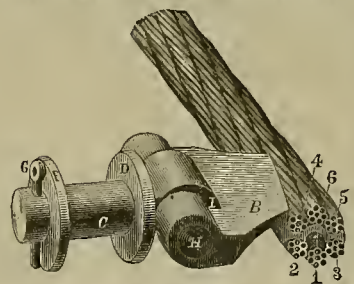


Fig. 5—CLIP INSERTED IN ROPE.

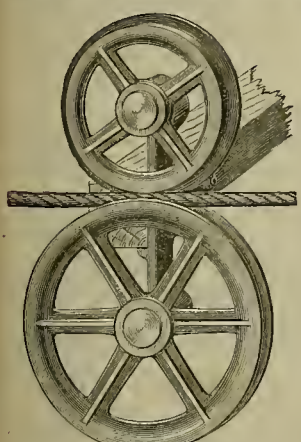


Fig. 3—GUIDE SHEAVE AND STAND.

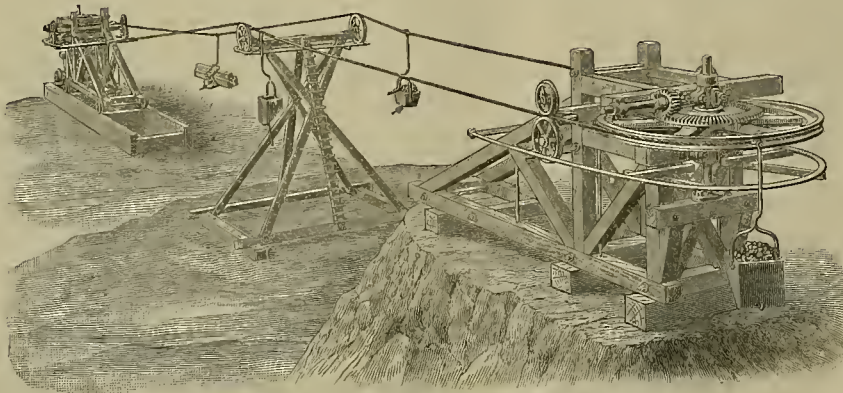


Fig. 1—THE VULCAN WIRE ROPEWAY

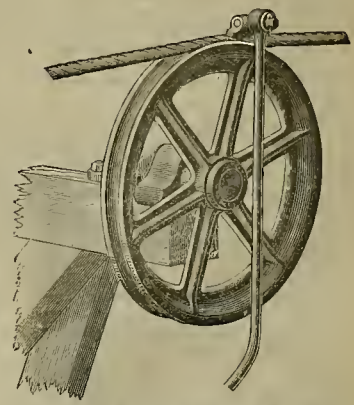


Fig. 2—SUPPORTING SHEAVE AND STAND.

The New Land Law.

Text of an Important Act.

Be it enacted, etc., That an Act entitled "An Act to amend an Act entitled 'An Act to encourage the growth of timber on the Western prairies,'" approved June 14, 1878, and all laws supplementary thereto or amendatory thereof, be, and the same are, hereby repealed: *Provided*, That this repeal shall not affect any valid rights heretofore accrued or accruing under said laws, but all bona-fide claims lawfully initiated before the passage of this Act may be perfected upon due compliance with law, in the same manner, upon the same terms and conditions, and subject to the same limitations, forfeitures and contests as if this Act had not been passed: *And provided further*, That the following words of the last clause of Section 2 of said Act, namely, "That not less than twenty-seven hundred trees were planted on each acre," are hereby repealed: *And provided further*, That, in computing the period of cultivation, the time shall run from the date of the entry if the necessary acts of cultivation were performed within the proper time: *And provided further*, That the preparation of the land and the planting of trees shall be construed as acts of cultivation, and the time authorized to be so employed and actually employed shall be computed as a part of the eight years of cultivation required by statute: *Provided*, That any person who has made entry of any public lands of the United States under the timber culture laws, and who has for a period of four years in good faith complied with the provisions of said laws and who is an actual bona-fide resident of the State or Territory in which said land is located, shall be entitled to make final proof thereon, and acquire title to the same, by the payment of \$1.25 per acre for such tract, under such rules and regulations as shall be prescribed by the Secretary of the Interior, and registers and receivers shall be allowed the same fees and compensation for final proofs in timber-culture entries as is now allowed by law in homestead entries: *And provided further*, That no land acquired under the provisions of this Act shall in any event become liable to the satisfaction of any debt or debts contracted prior to the issuing of the final certificate therefor.

DESERT LANDS.

Sec. 2. That an Act to provide for the sale of desert lands in certain States and Territories, approved March 3, 1877, is hereby amended by adding thereto the following sections:

"Sec. 4. That at the time of filing the declaration herebefore required the party shall also file a map of said land, which shall exhibit a plan of showing the mode of contemplated irrigation, and which plan shall be sufficient to thoroughly irrigate and reclaim said land and prepare it to raise ordinary agricultural crops, and shall also show the source of the water to be used for irrigation and reclamation. Persons entering or proposing to enter separate sections, or fractional parts of sections, of desert lands may associate together in the construction of canals and ditches for irrigating and reclaiming all of said tracts, and may file a joint map or maps showing their plan of internal improvements.

"Sec. 5. That no land shall be patented to any person under this Act unless he or his assignors shall have expended in the necessary irrigation, reclamation and cultivation thereof, by means of main canals and branch ditches, and in permanent improvements upon the land, and in the purchase of water rights for the irrigation of the same, at least \$3 per acre of whole tract reclaimed and patented in the manner following: Within one year after making entry for such tract of desert land as aforesaid, the party so entering shall expend not less than \$1 per acre for the purposes aforesaid; and he shall in like manner expend the sum of \$1 per acre during the second and also during the third year thereafter, until the sum of \$3 per acre is so expended. Said party shall file during each year with the Register proof, by the affidavits of two or more credible witnesses, that the full sum of \$1 per acre has been expended in such necessary improvements during such year, and the manner in which expended, and at the expiration of the third year a map or plan showing the character and extent of such improvements. If any party who has made such application shall fail during any year to file the testimony aforesaid, the lands shall revert to the United States and the 25 cents advanced payment shall be forfeited to the United States and the entry shall be canceled. Nothing herein contained shall prevent a claimant from making his final entry and receiving his patent at an earlier date than herebefore prescribed, provided that he then makes the required proof of reclamation to the aggregate extent of \$3 per acre: *Provided*, That proof be further required of the cultivation of one-eighth of the land.

"Sec. 6. That this Act shall not affect any valid rights heretofore accrued under said Act of March 3, 1877, but all bona-fide claims heretofore lawfully initiated may be perfected, upon due compliance with the provisions of said Act, in the same manner, upon the same terms and conditions, and subject to the same limitations, forfeitures and contests as if this Act had not been passed; or said claims, at the option of the claimant, may be perfected and patented under the provisions of said Act, as amended by this Act, so far as applicable; and all Acts and parts of Acts in conflict with this Act are hereby repealed.

"Sec. 7. That any time after filing the declaration, and within the period of four years thereafter, upon making satisfactory proof to the register and the receiver of the reclamation and cultivation of said land to the extent and cost and in the manner aforesaid, and substantially in accordance with the plans herein provided for, and that he or she is a citizen of the United

States, and upon payment to the receiver of the additional sum of \$1 per acre for said land, a patent shall issue therefor to the applicant or his assigns; but no person or association of persons shall hold by assignment or otherwise, prior to the issue of patent, more than 320 acres of such arid or desert lands, but this section shall not apply to entries made or initiated prior to the approval of this Act: *Provided, however*, That additional proofs may be required at any time within the period prescribed by law, and that the claims or entries made under this or any preceding Act shall be subject to contest, as provided by the law relating to homestead cases, for illegal inception, abandonment or failure to comply with the requirements of law, and upon satisfactory proof thereof shall be canceled and the lands and moneys paid therefor shall be forfeited to the United States.

"Sec. 8. That the provisions of the Act to which this is an amendment, and the amendments thereto, shall apply to and be in force in the State of Colorado, as well as the States named in the original Act; and no person shall be entitled to make entry of desert land except he be a resident citizen of the State or Territory in which the land sought to be entered is located."

PRE-EMPTION OF PUBLIC LANDS.

Sec. 3. That Section 2238 of the Revised Statutes be amended so as to read as follows:

"Sec. 2238. Any bona-fide settler under the pre-emption, homestead, or other settlement law shall have the right to transfer, by warranty against his own acts, any portion of his claim for church, cemetery, or school purposes, or for the right of way of railroads, canals, reservoirs, or ditches for irrigation or drainage across it; and the transfer for such public purposes shall in no way vitiate the right to complete and perfect the title of his claim."

Sec. 4. That Chapter 4 of Title XXXII, excepting Sections 2275, 2276, 2286 of the Revised Statutes of the United States, and all other laws allowing pre-emption of the public lands of the United States, are hereby repealed, but all bona-fide claims lawfully initiated before the passage of this Act, under any of said provisions of law so repealed, may be perfected upon due compliance with law in the same manner, upon the same terms and conditions, and subject to the same limitations, forfeitures and contests as if this Act had not been passed.

REVISED STATUTES AMENDED.

Sec. 5. That Sections 2289 and 2290, in said chapter numbered 5 of the Revised Statutes, be and the same are hereby amended so that they shall read as follows:

"Sec. 2289. Every person who is the head of a family, or who has arrived at the age of twenty-one years, and is a citizen of the United States, or who has filed his declaration of intention to become such, as required by the naturalization laws, shall be entitled to enter one-quarter section, or a less quantity of unappropriated public lands, to be located in a body in conformity to the legal subdivisions of the public lands; but no person who is the proprietor of more than 160 acres of land in any State or Territory shall acquire any right under the homestead law. And every person owning and residing on land may, under the provisions of this section, enter other land lying contiguous to his land, which shall not, with the land so already owned and occupied, exceed in the aggregate 160 acres.

"Sec. 2290. That any person applying to enter land under the preceding section shall first make and subscribe before the proper officer and file in the proper land office an affidavit that he or she is the head of a family, or is over twenty-one years of age, and that such application is honestly and in good faith made for the purpose of actual settlement and cultivation, and not for the benefit of any other person, persons, or corporations, and that he or she will faithfully and honestly endeavor to comply with all the requirements of law as to settlement, residence and cultivation necessary to acquire title to the land applied for; that he or she is not acting as agent of any person, corporation, or syndicate in making such entry, nor in collusion with any person, corporation or syndicate, to give them the benefit of the land entered, or any part thereof, or the timber thereon; that he or she does not apply to enter the same for the purpose of speculation, but in good faith to obtain a home for himself or herself, and that he or she has not directly or indirectly made, and will not make, any agreement or contract in any way or manner, with any person or persons, corporation or syndicate whatsoever, by which the title which he or she might acquire from the Government of the United States should inure, in whole or in part, to the benefit of any person, except himself or herself; and upon filing such affidavit with the register or receiver on payment of \$5 when the entry is not more than 80 acres, and on payment of \$10 when the entry is for more than 80 acres, he or she shall thereupon be permitted to enter the amount of land specified."

Sec. 6. That Section 2301 of the Revised Statutes be amended so as to read as follows:

"Sec. 2301. Nothing in this chapter shall be so construed as to prevent any person who shall hereafter avail himself of the benefits of Section 2289 from paying the minimum price for the quantity of land so entered at any time after the expiration of fourteen calendar months from the date of such entry, and obtaining a patent therefor, upon making proof of settlement and of residence and cultivation for such period of fourteen months; and the provision of this section shall apply to lands on the ceded portion of the Sioux reservation, by Act approved March 2, 1889, in South Dakota, but shall not relieve said settlers from any payments now required by law."

CLERICAL ERRORS.

Sec. 7. That whenever it shall appear to the Commissioner of the General Land Office that a

clerical error has been committed in the entry of any of the public lands, such entry may be suspended upon proper notification to the claimant, through the local land office, until the error has been corrected; and all entries made under the pre-emption, homestead, desert-land or timber-culture laws, in which final proof and payment may have been made and certificates issued, and to which there are no adverse claims originating prior to final entry, and which have been sold or incumbered prior to the 1st day of March, 1888, and after final entry, to bona-fide purchasers or incumbents, for a valuable consideration, shall, unless upon an investigation by a Government agent, fraud on the part of the purchaser has been found, be confirmed and patented upon presentation of satisfactory proof to the Land Department of such sale or incumbrance: *Provided*, That after the lapse of two years from the date of the issuance of the receiver's receipt upon the final entry of any tract of land under the homestead, timber-culture, desert-land or pre-emption laws, or under this Act, and when there shall be no pending contest or protest against the validity of such entry, the entryman shall be entitled to a patent conveying the land by him entered, and the same shall be issued to him; but this proviso shall not be construed to require the delay of two years from the date of said entry before the issuing of a patent therefor.

SUITS FOR ANNULLMENT.

Sec. 8. That suits by the United States to vacate and annul any patent heretofore issued shall only be brought within five years from the passage of this Act, and suits to vacate and annul patents hereafter issued shall only be brought within six years after the date of the issuance of such patents. And in the States of Colorado, Montana, Idaho, North Dakota and South Dakota, Wyoming and in the district of Alaska, and the gold and silver regions of Nevada, and the Territory of Utah, in any criminal prosecution or civil action by the United States for a trespass on such public timber lands or to recover timber or lumber cut thereon, it shall be a defense if the defendant shall show that the said timber was so cut or removed from the timber lands for use in such State or Territory by a resident thereof for agricultural, mining, manufacturing or domestic purposes, and has not been transported out of the same; but nothing herein contained shall apply to operate to enlarge the right of any railway company to cut timber on the public domain: *Provided*, That the Secretary of the Interior may make suitable rules and regulations to carry out the provisions of this section.

Sec. 9. That hereafter no public lands of the United States, except abandoned military or other reservations, isolated and disconnected fractional tracts authorized to be sold by Section 2455 of the Revised Statutes, and mineral and other lands the sale of which at public auction has been authorized by Acts of Congress of a special nature having local application, shall be sold at public sale.

Sec. 10. That nothing in this Act shall change, repeal, or modify any agreements or treaties made with any Indian tribes for the disposal of their lands, or of land ceded to the United States to be disposed of for the benefit of such tribes, and the proceeds thereof to be placed in the Treasury of the United States; and the disposition of such lands shall continue in accordance with the provisions of such treaties or agreements, except as provided in Section 5 of this Act.

ALASKA LANDS.

Sec. 11. That until otherwise ordered by Congress, lands in Alaska may be entered for townsite purposes, for the several use and benefit of the occupants of such townsites, by such trustee or trustees as may be named by the Secretary of the Interior for that purpose, such entries to be made under the provisions of Section 2387 of the Revised Statutes as near as may be; and when such entries shall have been made the Secretary of the Interior shall provide by regulation for the proper execution of the trust in favor of the inhabitants of the townsite, including the survey of the lands into lots, according to the spirit and intent of said Section 2387 of the Revised Statutes, whereby the same results would be reached as though the entry had been made by a County Judge and the disposal of the lots into such townsite and the proceeds of the sale thereof had been prescribed by the legislative authority of a State or Territory: *Provided*, That no more than 640 acres shall be embraced in one townsite entry.

Sec. 12. That any citizen of the United States twenty-one years of age, and any association of such citizens, and any corporation incorporated under the laws of the United States or of any State or Territory of the United States, now authorized by law to hold lands in the Territories, now or hereafter in possession of and occupying public lands in Alaska for the purpose of trade or manufactures, may purchase not exceeding 160 acres, to be taken as near as practicable in a square form, of such land at \$2.50 per acre: *Provided*, That in case more than one person, association or corporation shall claim the same tract of land, the person, association or corporation having the prior claim by reason of possession and continued occupation shall be entitled to purchase the same; but the entry of no person, association or corporation shall include improvements made by or in possession of another prior to the passage of this Act.

Sec. 13. That it shall be the duty of any person, association or corporation entitled to purchase land under this Act to make an application to the United States Marshal, *ex-officio* Surveyor-General of Alaska, for an estimate of the cost of making a survey of the lands occupied by such person, association or corporation, and the cost of the clerical work necessary to be done in the office of the said United States Marshal, *ex-officio* Surveyor-General; and on

the receipt of such estimate from the United States Marshal, *ex-officio* Surveyor-General, the said person, association or corporation shall deposit the amount in a United States depository, as he is required by Section numbered 2401, Revised Statutes, relating to deposits for surveys.

That on the receipt by the United States Marshal, *ex-officio* Surveyor-General, of the said certificates of deposit, he shall employ a competent person to make such survey, under such rules and regulations as may be adopted by the Secretary of the Interior, who shall make his return of his field notes and maps to the office of the said United States Marshal, *ex-officio* Surveyor-General; and the said United States Marshal, *ex-officio* Surveyor-General, shall cause the said field notes and plats of such survey to be examined, and, if correct, approve the same, and shall transmit certified copies of such maps and plats to the office of the Commissioner of the General Land Office.

That when the said field notes and plats of said survey shall have been approved by the said Commissioner of the General Land Office, he shall notify such person, association, or corporation, who shall then, within six months after such notice, pay to the United States Marshal, *ex-officio* Surveyor-General, for such land, and patent shall issue for the same.

Sec. 14. That none of the provisions of the last two preceding sections of this Act shall be so construed as to warrant the sale of any lands belonging to the United States which shall contain coal or the precious metals, or any townsite, or which shall be occupied by the United States for public purposes, or which shall be reserved for such purposes, or to which the natives of Alaska have prior rights by virtue of actual occupation, or which shall be selected by the United States Commissioner of Fish and Fisheries on the islands of Kodiak and Afognak for the purpose of establishing fish-culture stations. And all tracts of land not exceeding 640 acres in any one tract now occupied by missionary stations in the said district of Alaska are hereby excepted from the operation of the last three preceding sections of this Act. No portion of the islands of the Pribylov group or the seal islands of Alaska shall be subject to sale under this Act; and there shall be reserved in all patents issued under the provisions of the last two preceding sections, the right of the United States to regulate the taking of salmon and to do all things necessary to protect and prevent the destruction of salmon in all the waters of the lands granted frequented by salmon.

Sec. 15. That until otherwise provided by law, the body of lands known as Annette islands, situated in Alexander Archipelago in South-eastern Alaska, on the north side of Dixon's entrance, be, and the same is hereby, set apart as a reservation for the use of the Metlakatla Indians, and those people known as Metlakatla natives, who have recently emigrated from British Columbia to Alaska, and such other Alaskan natives as may join them, to be held and used by them in common, under such rules and regulations and subject to such restrictions as may be prescribed from time to time by the Secretary of the Interior.

MINERAL LANDS.

Sec. 16. That townsite entries may be made by incorporated towns and cities on the mineral lands of the United States, but no title shall be acquired by any such towns or cities to any vein of gold, silver, cinnabar, copper or lead, or to any valid mining claim or possession held under existing law. When mineral veins are possessed within the limits of an incorporated town or city, and such possession is recognized by local authority or by the laws of the United States, the title of town lots shall be subject to such recognized possession and the necessary use thereof, and when entry has been made or patent issued for such townsites to such incorporated town or city, the possessor of such mineral vein may enter and receive patent for such mineral vein and the surface ground appertaining thereto: *Provided*, That no entry shall be made by such mineral-vein claimant for surface ground where the owner or occupier of the surface ground shall have had possession of the same before the inception of the title of the mineral-vein applicant.

RESERVOIR SITES.

Sec. 17. That reservoir sites located or selected and to be located and selected under the provisions of "An Act making appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1889, and for other purposes," and amendments thereto, shall be restricted to and shall contain only so much land as is actually necessary for the construction and maintenance of reservoirs; excluding so far as practicable lands occupied by actual settlers at the date of the location of said reservoirs, and that the provision of "An Act making appropriations for sundry civil expenses of the Government for the fiscal year ending June 30, 1891, and for other purposes," which reads as follows, namely: "No person who shall, after the passage of this Act, enter upon any of the public lands with a view to occupation, entry or settlement under any of the land laws, shall be permitted to acquire title to more than 320 acres in the aggregate under all said laws," shall be construed to include in the maximum amount of lands the title to which is permitted to be acquired by one person only agricultural lands, and not to include lands entered or sought to be entered under mineral land laws.

Sec. 18. That the right of way through the public lands and reservations of the United States is hereby granted to any canal or ditch company formed for the purpose of irrigation and duly organized under the laws of any State or Territory which shall have filed or may hereafter file, with the Secretary of the Interior a copy of its articles of incorporation, and due proofs of its organization under the same,

to the extent of the ground occupied by the water of the reservoir, and of the canal and its laterals, and fifty feet on each side of the marginal limits thereof; also the right to take from the public lands adjacent to the line of the canal or ditch, material, earth and stone necessary for the construction of such canal or ditch: *Provided*, That no such right of way shall be so located as to interfere with the proper occupation by the Government of any such reservation; and all maps of location shall be subject to the approval of the department of the Government having jurisdiction of such reservation, and the privilege herein granted shall not be construed to interfere with the control of water for irrigation and other purposes under authority of the respective States or Territories.

Sec. 19. That any canal or ditch company desiring to secure the benefits of this Act shall, within twelve months after the location of ten miles of its canal, if the same be upon surveyed lands, and if upon unsurveyed lands, within twelve months after the survey thereof by the United States, file with the Register of the Land Office for the district where such land is located a map of its canal or ditch or reservoir; and upon the approval thereof by the Secretary of the Interior the same shall be noted upon the plats in said office, and thereafter all such lands over which such rights of way shall pass shall be disposed of subject to such right of way. Whenever any person or corporation, in the construction of any canal, ditch or reservoir, injures or damages the possession of any settler on the public domain, the party committing such injury or damage shall be liable to the party injured for such injury or damage.

Sec. 20. That the provisions of this Act shall apply to all canals, ditches or reservoirs heretofore or hereafter constructed, whether constructed by corporations, individuals or associations of individuals, on the filing of the certificates and maps herein provided for. If such ditch, canal or reservoir has been or shall be constructed by an individual or association of individuals, it shall be sufficient for such individual or association of individuals to file with the Secretary of the Interior, and with the Register of the Land Office where such land is located, a map of the line of such canal, ditch or reservoir, as in case of a corporation, with the name of the individual owner or owners thereof, together with the articles of association, if any there be. Plats heretofore filed shall have the benefits of this Act from the date of their filing, as though filed under it: *Provided*, That if any section of said canal or ditch shall not be completed within five years after the location of said section, the rights herein granted shall be forfeited as to any uncompleted section of said canal, ditch or reservoir to the extent that the same is not completed at the date of the forfeiture.

Sec. 21. That nothing in this Act shall authorize such canal or ditch company to occupy such right of way except for the purpose of said canal or ditch, and then only so far as may be necessary for the construction, maintenance and care of said canal or ditch.

Sec. 22. That the section of land reserved for the benefit of the Dakota Central Railroad Company on the west bank of the Missouri river, at the mouth of Bad river, as provided by Section 16 of "An Act to divide a portion of the reservation of the Sioux nation of Indians in Dakota into separate reservations, and to secure the relinquishment of the Indian title to the remainder, and for other purposes," approved March 2, 1889, shall be subject to entry under the townsite law only.

Sec. 23. That in all cases where second entries of land on the Osage Indian Trust and diminished reserve lands in Kansas, to which at the time there were no adverse claims, have been made, and the law complied with as to residence and improvement, said entries be, and the same are hereby confirmed, and in all cases where persons were actual settlers and residing upon their claims upon said Osage Indian trust and diminished reserve lands in the State of Kansas on the 9th day of May, 1872, and who have made subsequent preemption entries either upon public or upon said Osage Indian trust and diminished reserve lands, upon which there were no legal prior adverse claims at the time, and the law complied with as to settlement, said subsequent entries be and the same are hereby confirmed.

Sec. 24. That the President of the United States may from time to time set apart and reserve, in any State or Territory having public land hearing forests, any part of the public lands wholly or in part covered with timber or undergrowth, whether of commercial value or not, as public reservations; and the President shall, by public proclamation, declare the establishment of such reservations and the limits thereof.

THE FISH COMMISSION.—Fish Commissioner Joseph D. Redding states that to overcome the growing scarcity of salmon the Commission will have to stock the streams with 3,000,000 salmon fry and will establish a hatchery on the San Francisco peninsula. At present there are only two salmon hatcheries, one at Lake Tahoe and the other in Shasta county.

IN REMOVING DEPOSIT AND SEDIMENT from tubular boilers, the usual holes should be often opened and all collection removed from over the fire. Also, when boilers are fed in front and blow off through the same pipe, the collection of mud or sediment in the rear end should be often removed.

COPPER STEEL is a new alloy of steel containing about 12 per cent of copper. Such alloys as low as four per cent of copper promise to become quite useful in the arts. But too little is known as yet to give any definite idea of the comparative value of such alloys.

Old-Time Reminiscences—Senator Hearst.

EDITORS PRESS:—Do I know Senator Hearst? asked a friend. Yes; better than his son knows him. Why, I am the individual who first hauled George up into the light of business life, and hereby hang one of many tales I can tell of my old friend. I'll only give you one now.

In the latter part of 1850, in consequence of my mining experience on Lake Superior, I was consulted by a friend living in Sacramento as to milling of gold, etc., he stating at the same time that he had invested a good deal of money in a mill in Nevada Co., and that they had just found out they had no mine. But, says my friend, there is a good mine up there belonging to a lot of Missouri boys, and that a young fellow by the name of George Hearst was working there. The object of the talk was, my friend wanted me to go and see what could be done with these Missourians, by way of getting their mine. Under certain considerations I consented to go, and had a *carte blanche* to do what I thought best. I started for Nevada, arrived the following day, and on inquiry found "George Hearst" was well known, but he was two miles off, over at Gold Flat. George always was one of those genial souls who once known would ever be remembered, liked and accommodated. Notwithstanding it was late in the afternoon, I started, and followed the trail shown me until the place was found. To a man at the windlass I asked, "Is there a Mr. Hearst here?" "George Hearst? Yes; there he's down the shaft. Do you want to see him?" Answering that I did, he hallooed out, "George, there's a man here wants to see you." "All right, haul me up," says George, and so the man tugged at the windlass. As George always was weighty on a pull, I gave a hand, and up he came. Landed, there stood before me a tall, spare, regular New Madrid Missourian in his shirt-sleeves, and having on the regulation brown Kentucky-jeans pants, roughly tucked in his boots. He was as true a California, old-time miner as could be found. I can see him now, and I don't not, were he living, but he would give more for a good oil-painting of himself as he then stood than he has since given for the richest piece of his present gallery. I introduced myself, and, to make things easy, half-way broached the business I was on. "Well, Bill," says George to the man at the windlass, "goes we'll quit; worked enough for one day, anyhow." (George never was much on the hard work; prospecting around was his forte, looking for big strikes that others could work at. He has kept this up ever since.)

"Come over to the cabin," says George to me, "and see the boys. You will have to stay all night. Guess we can fix to have you bunk with some of us." (There never was anything mean about George; he naturally had a kindly heart.) After a parley, I consented to accept the invitation, and off we posted to the cabin—a regular old-time miners' log-cabin, where all the light there was in daytime came in at the door and down the chimney. Soon, one by one, the "Missouri boys" began to come in from their labors of sluicing and various mining work.

All were partners in receipts, expenditures, and possessions. Of course I was introduced, and by the time supper was ready, they numbered some nine. Lord! thinks I, nine men to barter for a mine. It looked dubious. After supper we all got circled round the big fireplace, and the day's doings were talked over. No lamps or candles were required; the snapping fire gave light enough.

The comfort of these old log cabins, none but the pioneer can appreciate. In them there were more joyous hearts—more solid, robust health, more real mental and physical comfort, than are to be found in gilded palaces of the present. Not only this, but you could always find in them brains—men of education, of nerve—men who thought, and men who dared to do. Gold warmed the blood and brain to their greatest power, and there was plenty of gold. None but he who passed through the fire of these spirited times can understand the life and light of a home in the old log cabin of "49 and '50." But to our story: Our Missouri boys were all a light-hearted, jolly set. George, whom I considered was captain of the crowd, finally brought the business before the house (his first experience in senatorial duties), but as you may suppose, there was a good deal of doubting—they did not know who I was, and to do as I proposed, why, they did not know about it, etc., etc., and then they would start off talking about old Missouri. Finally I concluded to drop the subject and talk Missouri, too. I could see they began to have a better opinion of me when they found I was from Missouri (St. Louis), so I ran on Missouri for all there was possible. That was the winning card. The next dash at business we agreed on all points, and concluded the trade. The detail was left to George, who seemed to have the confidence and leadership of the boys. What George did was all right. This was 40 years ago, and I think from that period to the present he has never, to my knowledge, betrayed any confidence reposed. Well, to cut a long story short, we Missouri boys never had a business disagreement. In politics we differed, but we all remained good friends, as long as any were in sight. Quite a number of the nine are now lying beneath the sod, where the balance of us soon will be, simply numbered as a few of the many belonging to the heroic age of California.

ALMARIN B. PAUL.

Oro Blanco, Arizona.

EDITORS PRESS:—In my last communication sent you, I promised to give the readers of your valuable paper a description of other mining properties on what is known as the Yellow Jacket lode, and in which is contained the fast-heooming-famous mine of that name.

This mineral-bearing belt is traceable for five to six miles, upon various locations of which are found large deposits of gold and silver bearing ores of good average grades.

According to reports made by different mining experts, the mineral found on this lode lies deposited between porphyry, gneiss, granite, etc., and wherever development work has been done, the ledge shows a dip of from 12 to 15 degrees northeast, the course of said lode being northwest and southeast, the geological formation and situation being favorable to a true fissure vein.

The Yellow Jacket mine, having a present depth of 250 feet, is now the deepest-worked mine on the lode, and the vein matter may be described as containing talc, slate and quartz carrying about 75 per cent free gold, while the residue, 25 per cent, is combined with sulphur, iron and lead.

The first easterly extension of the above-named mine is known as the Empire, owned by G. S. Phillips and J. H. Forman, and contains a similar deposit to that of the one just mentioned on the surface. Owing to want of capital, this claim has as yet not been developed to a depth exceeding about 15 feet, at which point every indication is favorable to the opening of a good paying property.

The second easterly extension is known as the old Ostrich, a mine worked 15 or 16 years ago. For the working of the ore from this claim there was once erected a ten-stamp mill at Oro Blanco, an old mining town some two and one-half miles distant therefrom. This property has for its present owners Messrs. Handy, Bartlett and Leatherwood, who report very rich ore taken from the mine during the days it was being worked, but the general mill test shows about the average grade of gold ore—about \$12 per ton.

Still east of this and contiguous thereto are found two or three more locations showing good ore along the surface, but none of which have sufficient work done to show up what they may prove to be, veritable bonanzas.

Tracing this lode southeast for a distance of five or six locations of 1500 feet in length each, it becomes invisible along the surface for about two miles, when it again exposes itself to view in huge form, and thoroughly demonstrates the fact that Oro Blanco district is the possessor of the largest mineral deposits in the Territory of Arizona. Capital only is lacking to prove the fact that here consorting through Mother Earth lies buried precious metals in quality and quantity equal to the old Comstock of Nevada.

The first property on the second exposure of the Yellow Jacket lode and the largest mineral showing on the surface, happened to be the property of its lucky owner J. M. Kirkpatrick, one of the oldest residents of Oro Blanco district. This claim is known as the Ragnarook and has had a mill test of over 150 tons of ore, giving no doubt satisfactory results, from the fact that an Eastern party not long ago made an offer for this claim of \$7000 cash, and would in all probability pay double the amount were it purchasable for that price.

Any one visiting this property can see, in large square piles, hundreds of tons more of the same ore, not to speak of the amount in sight not including the above mentioned. Any one desiring further information concerning this claim, can readily obtain it by addressing its owner at Oro Blanco, Pima county, Arizona.

Still easterly and continuous to the above property is found the old Austerlitz, a mine not having been worked for a number of years until within the last two, during which time it has been successfully opened by its present owners, Dr. A. H. Noon & Sons. A mill-test of over 400 tons has yielded sufficient to warrant further labor, and there yet remains enough ore to guarantee a business-meaning company a good profitable property.

Still easterly to the above can be found the Foraken, the Ohina mine, the Pedatlok and others of good repute; and next comes the well-known Montana mine. The Montana has been worked for a number of years past and is being worked to-day with results sufficient to warrant the packing of the ore for 12 miles on burros to the Oon. Arizona mill, where it is successfully treated by Mr. Forman, who, by the way, is one of the best and most competent millmen in these parts.

Adjoining this, last but not least by any means, comes the Border mine, owned by Geoghegan & Forman, who are working it daily with good results.

As I have consumed considerable space in your columns in tracing easterly the different locations of note on the Yellow Jacket lode, I will desist from showing the various workings on each of the claims mentioned until my next, when I shall endeavor to show the amount of work done, together with the feasibility of capital making a profitable investment in this district; and also trace westerly the different properties on the aforesaid lode in connection with work done thereon.

By way of conclusion, allow me to state that should any one with proper means and business intentions desire to know all the particulars about any of the aforesaid properties, he can easily obtain the necessary information

through letter, by applying to any of the parties named.

Middlemen will, however, be entertained only according to their financial and influential weight—personal estimate taken by the party applied to. They are a class of people not very highly appreciated by the residents and property-owners of this district, from the fact that in too many instances have the sales of good claims been foiled by their own general avariciousness, viz.: wanting to make the largest stake themselves and defraud the original finder and owner.

I. C. U.
Oro Blanco, Arizona.

Soapstone.

Its Various Uses in the Trades.

Away back in childhood's days the slate-pencil most desired by juveniles was made from soapstone. The boys liked it because it did not scratch their slates. Few people have any idea of the importance this common rock has assumed in the erection of buildings of the present day.

Mr. W. H. Ramey of Williams & Co., 90 Ann street, N. Y., gave some quite interesting facts in the matter to a representative of the *Saturday Globe*. Soapstone, or steatite, is a mineral of the magnesian family, which has been grouped by Dana under the "Talc Section." It has a grayish-white or greenish-white color. The mineral is found in veins in the earth. It has a dull or fatty luster, and when rubbed on a smooth surface leaves a feeble mark. It is soft and easily cut with a knife. In Europe the substance is found in England, the Shetland islands, in Bavaria and Hungary. In this country the largest quarries are in Vermont, New Hampshire and in Virginia. The mineral is composed mainly of silica and magnesia, with more or less alumina and water.

Soapstone was used by the people up in Vermont soon after the Revolution. Its well-known resistance to the action of both heat and cold was speedily discovered after the first veins were opened by the quarries. To this day there are yet standing many old houses in the Green Mountain State which have grates and fireplaces built of soapstone slabs. Some of the Yankee got up a soapstone pencil, and with it for years the children marked out their simple arithmetic and labored to copy writing lessons. Boston is still the center of the soapstone manufacture. Williams & Co. have their principal office in that city, but their quarries are at Franconstown, New Hampshire. There are many large quarries near Chester, Vermont, owned by the Empire Soapstone Works. In later years the Albemarle Soapstone Co. of this city have opened great veins of steatite in Albemarle county, Virginia. These quarries are located about 100 miles from Richmond. The Virginia mineral is harder than the talc from the Green mountains, while the Franconstown soapstone is capable of a higher polish.

The only limit to the use of the mineral is the scarcity of good steatite. Nine tenths of all that is quarried is found to be of such poor quality as to be only fit for the manufacture of small articles or powders. While easily cut, the mineral is not so easily broken. Soapstone is used in the manufacture of porcelain. It melts easily on glass and is used by glaziers for marking plates of glass before they are cut with the diamond. Tailors use it for marking cloth before they cut it. Shoemakers use soapstone powder to make new shoes slip on easily. Glove-fitters use the powder for the same purpose. It is sold for such purposes under the name of Briancon chalk, French chalk and Venice talc. It is the basis of rouge. It is used for imitating engraved stones, being easily cut and afterward hardened by the action of heat. Then it may be colored by metallic solutions. The figure stone of China is a kind of steatite containing a little potash.

The soapstone of the Eastern States is of a soft talcky nature, very coarse and uneven in texture. The softer parts wear away rapidly and leave the surface rough and uneven. The Albemarle stone is of a close grain. In use it becomes like polished marble and is very strong. The New Hampshire article is capable of a high polish and is used for decorative purposes. The methods of work in the quarries are as yet, as the proprietors guard against competition close by. Many of the quarries are fenced around. The most of the quarrying is done by channeling. Holes are drilled in a square shape about 12x6 feet. Then the big piece is drilled under and lifted from the vein to be worked up in the factories. The latter are near by. The slabs for tube, etc., are made up in the factories, and shipped to desired points where the parts are fitted and placed in position. The parts are joined with bolts and made water-tight with cement.

In many of the new buildings recently erected, soapstone has been used freely in the closets and basins, taking the place of the more showy and expensive marble.

Even in the jewelry trade steatite has been found of value. Crucibles are hollowed out of the mineral. The molds in which are fashioned the delicate crystals for watches are soapstone. In the engine-room powdered steatite has been found useful as an ingredient in steam-packing, and the article is employed as a lubricant.

The use of the article is rapidly extending. A large factory has been established in Chicago recently for the manufacture of stationary wash-tubs, bathtubs and elabe for fireplaces, grates and stoves.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

THE HARDENBURG.—Calaveras *Citizen*, March 14: The Hardenburg mine, on the Amador side of the Mokelumne, promises to become a paying and prominent mine of our State. We were shown last week some fine looking quartz taken from this mine, and also conducted through the lower levels and stopes, so we know where we speak. A test crushing of 100 tons of rock at the Amador mill, which is now being done. They have at present enough rock in sight to keep the mill running a year, and are now running a new level at 400 feet through a vein of fine looking quartz. Although in Amador, the opening of this mine will be a benefit to Calaveras, as it is just over the line and gives work to a number of Calaveras men.

CLINTON CONSOLIDATED.—Amador *Ledger*, March 14: Some very rich ore was taken from the Union mine at Irishtown last week. The rock was sprinkled with free gold. A box of from 50 to 100 pounds of this kind of rock was sent to headquarters in San Francisco. From all that we can learn the property is on a paying basis, with enough rock in sight to last for a year or two. Whether the ledge goes to any great depth is a question yet to be determined. At any rate, all the prospects are encouraging for a solid, permanent mine.

BELL WETHER.—The horse-power whim is in running order, and was started early this week. The shaft is 40 feet deep and has 30 feet of water. It will take several days to drain it. It is expected that this machinery will enable them to sink to the depth of 200 feet.

BELMONT MINE.—This company started their 10-stamp mill last Wednesday, day times, on ore coming from the surface tunnel. Eighty feet yet remains to be driven before an upraise can be started and the mill supplied day and night.

PLYMOUTH.—Cor. Amador *Ledger*, March 14: The people over this way are putting in their time hunting for gold in the gulches where the late rains have washed the dirt away and left it exposed. Some nice specimens have been found. There is no doubt that this part of Amador county would support a much larger population, and that money would be plentiful if it were not for mining land being taken up by agricultural claimants. But so it is, so it seems it will have to remain, as the farmers don't seem to think there is anything good in mining, and will neither indulge in it themselves nor let any one else.

Mariposa.

COULTERVILLE.—Mariposa *Gazette*, March 14: The Iron Duke is showing splendid ore in the tunnel which they are running. The Tyora mine was shut down on Jan. 31, for reasons best known to themselves, but outsiders can guess. The Black Bart mine is still showing favorable prospects as they go down. They are still sinking the main shaft. A rich pocket has just been struck in the Bonadur mine, the extent of which is not yet known, but if it should hold out long and turn out such specimens as were exhibited to us, the company will have all they want in a short time. The Quail mine, on Indian creek, is, and has been running for the last month, to its full capacity on good ore, which is paying better than they expected. They are satisfied that the rock will average at least \$15 per ton. The mine is the property of Mr. Francisco Bruschi of this place, and is a good mine.

CHISPAS.—The mining excitement keeps up, and numerous chispas are picked up in the gulches and streets. A rich spot of ground was found below town where a good deal of gold was panned out by the fair maidens of the forest.

Nevada.

NORTH STAR MINE.—Grass Valley *Union*, March 17: The shaft of the North Star mine is now being sunk for the 2100 level, and a strong vein is showing in the shaft. The upraise from the No. 20 to the 19 level, 700 feet west of the shaft, has just been completed, which opens an extensive block of ground of excellent ore. The mine is looking well and the returns are profitable.

EXTRACTION WORKS.—The new extraction works are practically completed, and the company is about ready to receive concentrates and ores for working. The water-power connection for the works has just been made with the Grass Valley Water Co.'s main pipe line.

THE ST. JOHN MINE.—*Tidings*, March 16: Mining men generally and our business men also are gratified to hear of the encouraging reports from the St. John mine. On Friday last a test was made of some of the quartz from this mine in a hand mortar. Ten pounds of rock gave a prospect of 90 cents, although no free gold was visible in the quartz. The ledge is eight feet wide at a point about 80 feet west of the shaft on the 150-foot level. The quartz carries a large amount of galena and sulphurets. The owners are gratified at the results obtained.

A NEW LOCATION.—Wm. Eddy was showing some quartz on the streets to-day that came from a ledge about six miles northwest of Grass Valley. The ledge is 12 feet wide, the rock showing considerable sulphurets. The piece shown was taken from a shaft 48 feet deep. A crushing of some rock from this ledge several years ago yielded \$4 per ton. The owners of the ledge are Wm. Eddy, John Oliver, Richard Seymour and James Seymour. Water-power can be obtained for working with a fall of 200 feet. The ledge can be worked on the tunnel system at a small cost.

ST. JOHN MINE.—Grass Valley *Union*, March 15: The developments at the St. John continue to be highly encouraging. At a point 80 feet west of the shaft on the 150-foot level the ledge is now showing a width of eight feet, the quartz carrying a large amount of sulphurets and galena, and prospects in free gold. On Friday a test was made of the quartz in a hand mortar, and ten pounds of rock gave a prospect of 90 cents in free gold, although no gold was visible to the eye in the rock. This is very encouraging, and it is not improbable that specimen rock will soon be encountered, as appearances indicate that the drift is getting into a pay shoot. The width of the lode is also a favorable indication, and it is not at all improbable that the St. John is one of

the coming mines in the district. The ledge, at present, stands nearly vertical, and while the supposition is that it will take a snuthly dip, that fact is not likely to be established until deeper working is attained. The general appearance of the quartz taken from the ledge is excellent, as it is lively and has all the points of being gold-bearing.

PEABODY MINE.—Grass Valley *Union*, March 18: The new shaft of the Peabody mine has been started. It is located about 500 feet west of the present working shaft and will be in dimensions 18 feet by 6, divided into three compartments and constructed in the most substantial manner. The surface excavation is now down 12 feet, and the work of putting in the timbers will be commenced immediately. While the shaft is being sunk there will be no interruption of the work in the mine. As the shaft is being sunk from the surface, an upraise will be made to connect with it from the lower levels.

CALIFORNIA.—The Directors of the California M. Co. (the location of the ground being on Deadman's Flat) let a contract on Monday for clearing out and retimbering the shaft. The work is to be started at once, and it is expected that in six weeks the work of opening the drifts and stopping the ore can be commenced.

NORTH BANNER.—The No. 4 level below the adit level in the North Banner mine is now being opened by the cutting out of a new station. The ledge at the bottom of the shaft is large and the ore of high grade. The company will declare another dividend next month.

PITTSBURG.—Work is going on regularly at the Pittsburg mine, there being 15 miners at work on day pay and tribute contract. The mill is run a portion of the time in crushing ore taken from the mine. The ore is of fair milling quality.

Mono.

ANOTHER RICH STRIKE.—Bridgeport *Chronicle-Union*, March 14: We learn that a rich strike has been made in the Goleta shaft in the Jordan district, a body of ore over two feet thick having been cut. It is said the ore is rich in both gold and silver. The Goleta is one of a syndicate of mines owned by a S. F. company, with Dan E. Jones as superintendent. Mr. Jones is also having a fine tunnel run to cut the ledges at a great depth, and to enable the owners to work economically without expensive hoisting works. There is no doubt felt here as to the early coming out of the Jordan district, which only needs capital and well-directed labor to bring the district to the attention of the commercial world.

San Diego.

AT PINACATE.—Riverside *Press and Horticulturist*, March 14: We had the pleasure of a visit Thursday from J. Everett Bird, secretary of the Good Hope Con. Mining Co. This company has been developing the gold mines at Pinacate, five miles east of Parris, for the last year, expending so far about \$30,000 in the work. They paid \$50,000 for the mine in the first place, and having plenty of capital, have gone to work in a systematic manner to develop it. The results are far beyond their expectations, as they now have, at a depth of 400 feet, ore enough in sight to keep a 20-stamp mill at work for five years, on quartz that will run from \$25 to \$2000 per ton. These gentlemen have a perfect bonanza in the Good Hope, as is demonstrated by the fact that a couple of weeks ago they refused \$500,000 for the property. A fine Bryan quartz mill has been set up and just commenced running on the ore this week. Buildings were erected of a substantial character, and every preparation made for the permanent working and developing of this magnificent property. James M. Sigafus is president of the company, and he and Mr. Bird are the men who have brought the property to its present profitable condition. The shipping of gold bullion from the Pinacate mine will soon be a regular thing.

STONEWALL.—Julian *Sentinel*, March 13: W. S. Waterman has our thanks for a very fine specimen taken from the 600-foot level of the Stonewall mine with the diamond drill. It is 18 inches in length and can be seen any day at this office. The management at the mine is feeling pretty good these days, notwithstanding the various rumors floating around in the air.

Sierra.

EXTENSION TUNNEL.—Mountain *Messenger*, March 14: Messrs. Forbes and Kyle made a flying trip to the new extension tunnel (in, March 4th, just one mile from daylight) last Sunday, most of the way on snowshoes. Forty feet was made last week, with the main tunnel through very soft-picking, yellow-colored bedrock that needs no blasting, deemed favorable for closeness to gravel. An upraise was started near the face, last Wednesday, for the channel.

GRAVEL has been found lower down in the Golden Giant. A drift was run off from the incline, 90 feet below where the prospect was bad, and good looking gravel found within a short distance. There is but little doubt but that good pay will be found when the channel is bottomed. A rich ledge has been found in a crosscut of No. 2 tunnel, with a width of five feet, but no hanging-wall, by the Buttes Saddle Co., Sierra City. During the recent rains small pieces of gold have been found in the streets and near the rivers of Downieville.

Shasta.

OLD DIGGINGS.—Cor. Redding *Free Press*, March 12: The miners of Old Diggings pursue the even tenor of their way, upon the hillsides, within the gulches and ravines. They are to be found digging for dear life, as it is of the utmost importance to utilize every drop of water as long as it lasts. The rains which have fallen so far have been barely sufficient to furnish an adequate supply of water for sluicing purposes. Where enough of the fluid cannot be found for the first-named purpose, the rocker is brought into play, though it is the most primitive and slowest method of moving the paying gravel. Still men manage to make a grubstake.

Siskiyou.

BLUE GRAVEL.—Yreka *Journal*, March 11: Lee, Lash & Co., of the blue gravel claim at mouth of Greenhorn, near Yreka, still continue to take out rich pay, and are now working the claim day and night, with a force of 16 hands. The force is divided into two shifts at present, eight men to each shift, with four in the drifts and four on the surface, the latter attending the steam pump, sluices and hoisting machinery. The gold taken out for nine days preceding last Saturday, amounted to \$600, with only day work of four drifters. Instead of

further prospecting at present to ascertain the extent of the pay channel, they deem it best to double the force in performing as much work as possible before the supply of water runs short, as the dry winter this season may not afford much water for as long a run as usual in washing the gravel. When the water gives out, the company will then extend the work of drifting farther along the channel. The extent of the channel is known to reach clear down to the stage-road, a distance of 500 yards, where a prospect shaft was sunk some time ago. With eight men in the drift, not less than from \$125 to \$150 per day will be realized, the gravel paying from \$15 to \$25 per day to each drifter, since first tapping it to the present. Louis Guilbert, who has been sinking a shaft in the Kildore Hills, about three miles south of Yreka, on the east side of Shasta Valley wagon-road, has been obliged to abandon work on account of the late storms filling it with surface water, causing caving in. He will run a tunnel from the creek at the wagon-road, expecting to strike blue gravel within a distance of 250 feet, or may find it all the way to where his shaft was sunk. The creek where he intends starting the tunnel paid very rich in 1884, but blue gravel leads of old channels under hill were not thought of then. W. A. Chamberlin and a number of others have also commenced sinking a shaft in the vicinity of Louis Guilbert's claim, and found sandstone near the surface, under which they believe blue gravel exists. They expect to go down about 150 feet, and will probably have no water to contend with until getting through the sandstone quarry. If successful in finding the blue gravel, they can tap it with a tunnel for good drainage, which can also be utilized for wheeling to sluices, with water from the tunnel for washing. Boyle & Co. and Spencer & Co., of Humboldt, are doing some work in their quartz mines at the head of Humboldt creek, but as the snow is still between three and four feet deep on the mountain, they are unable to get quartz to the mills or to run them to good advantage. The snow is rapidly disappearing, however, under the influence of the late warm rains, and in a few weeks more it will no doubt be all gone, or reduced sufficiently to permit easy hauling and getting over the ground.

Trinity.

HAY FORK QUARTZ.—*Journal*, March 14: A few are still at work on quartz prospects at Hay Fork. Good ore is being taken out, but it has not yet been found in very large quantities. We were told a few days ago that the boys pounded out \$7.50 recently in about two hours with a hand-mortar. The rock goes 50 cents per pound. If they can manage to strike the main ledge it will doubtless be a bonanza.

Yuba.

QUARTZ.—Marysville *Democrat*, March 14: There are many good quartz ledges in this county that have been partially developed in time past, and many others that have not been worked to any extent. Many of our readers who have traveled on the La Porte road will remember a ledge that was prospected by the roadside just beyond Brownsville and on the place formerly kept by Wm. Howell, deceased. Some three years ago, J. C. Campbell commenced to develop the ledge and later put up a small roller mill to grind the rock so as to thoroughly test it, and he kept at work quietly until he became fully satisfied that it was valuable and would pay if worked to advantage. He has now made arrangements to put up a 12-stamp mill this spring and put in all of the latest improvements to save gold, and has no doubt of ultimate success of the mine. Himself and wife, both being practical chemists and assayers, have thoroughly tested the quality of the ore in every way and know what it will do in a working test by mill process.

NEVADA

Washoe District.

CON. CAL. & VA. MINE.—Virginia *Chronicle*, March 14: 1200 level: Continue to extract some milling ore from above the line of the drift run north from the east crosscut No. 1 from the south drift from the shaft station. 1300 level: Have continued to extract some milling ore from the point where the upraise carried up from the end of the east crosscut from the south drift connected with the fourth floor stopes. 1500: The width and quality of the ore which is exposed in the opening 43 feet above the sill floor of this level continues to hold good. 1600: Have continued to take out some ore along and above the line of the drift run east through the old stopes on the sill floor of this level; also from the stopes which are being worked both north and south from that drift. Have continued to stope out ore at the point which is 200 feet south from the north line of the California ground, and 44 feet above the sill floor of this level, and the ore there continues to be of good quality. 1650: The usual quantity of ore has been extracted from the various openings of this level, also some ore in working out from the winze No. 2 at 35 feet above the sill floor of the 1750 level. 1750: Drift running southwest from the northwest drift from the main west drift from the C. & C. shaft has been extended in a south course 14 feet; total length, 579 feet in quartz which yields some milling ore. There has been extracted from all parts of the mine during the week 1540 tons of ore, which was shipped to the Eureka mill. The average assay value of all of the ore worked at that mill during the week (1535 tons) was \$29.20 per ton.

OPHIR.—The east crosscut started from near the end of the drift run north from the drift run west from the winze, 122 feet below the sill floor of the 1300 level, has been extended 25 feet; total length, 35 feet; continuing in a quartz formation, which carries a low assay value.

UNION CON.—East crosscut No. 2 on the 1465 level, started from the north lateral drift at a point 200 feet south from the south boundary line of the mine, has been extended 27 feet; total length, 690 feet; showing strips of clay.

MEXICAN.—The east crosscut, No. 1, started from the main north lateral drift at a point opposite the west crosscut, No. 1, has been extended 24 feet; total length, 540 feet; continuing in porphyry showing clay with a little water.

JUSTICE.—The north drift 822 level was advanced 33 feet since last report and is now out a total distance of 415 feet. The face is in a mixture of clay and porphyry with stringers of quartz.

CROWN POINT.—The west crosscut on the 500 level is out 143 feet. The face is in soft porphyry. Have started to clean out and repair the lateral drift

from the east crosscut from the shaft on the 1000 level, and have completed 110 feet; also engaged in raising from the 1300 stope, and are now above the sixth floor. The top is all clean quartz of low grade.

KENTUCK CON.—Have advanced and timbered the east raise on the 1000 level a total distance of 42 feet. The top is in low-grade quartz. Are cutting out for timbers in the east crosscut from the north drift on this level. Are saving some pay from the bunches of ore encountered.

OVERMAN.—Have extracted 388 tons of ore. Car sample assays average \$19.18 per ton. Shipped to the Brunswick mill 330 tons of ore. On the 1100 level the north drift from the north upraise has been advanced 25 feet through ore of fair grade; total length, 57 feet.

CHALLENGE AND CONFIDENCE.—The joint Confidence and Challenge west crosscut from the north drift on the 1100 level is out 240 feet. The face shows porphyry. The joint Yellow Jacket, Confidence and Challenge north drift on the 1000 level is in 519 feet. The face shows quartz having no value.

BELCHER.—The south drift from No. 3 east crosscut, 2nd level, has been advanced 18 feet; face in a mixture of porphyry and quartz. No. 3 west crosscut, 300 level, has been advanced to 143 feet. The face is in porphyry, clay and low-grade quartz.

CON. IMPERIAL.—Work is still being confined to following up and taking out small streaks of ore on the upper levels and overhauling the old stopes.

SEG. BELCHER.—On the 600 level the east crosscut from the south lateral drift has been advanced 30 feet since last report, and is now out a total of 136 feet; face in a heavy clay.

HALE & NORCROSS.—On the 1100 level the east crosscut on our north boundary has been advanced 20 feet, making its total length 200 feet, and has reached the east clay wall. On the 1400 level the north drift was extended 25 feet; total length, 265 feet. This drift has been connected with the Savage south drift from the bottom of their 1300 winze. The south drift on this level continues in a favorable-looking quartz body, and was advanced 30 feet; total, 106. The face of this drift has reached the south boundary and we will start east and west crosscuts on this line this week. No. 4 west crosscut near our south boundary was advanced 15 feet; total, 60.

SAVAGE.—Milled the past week 440 tons of ore worth \$17.20 a ton as per battery assays. The north upraise, 300 level, is advanced 123 feet and continues in low-grade ore. From the east crosscut on the 900 level are stopping ore of fair quality. From the face of the north drift on the 800 level we have started east crosscut No. 1 and advanced the same 35 feet. This crosscut shows seven feet of fair-grade ore.

CHOLLAR.—Winze 80 feet south of north line, 750 level, is down 102 feet. The bottom is in clay. The 1100 level incline station is completed and are now sinking for chutes. Extracted and sent to the mill 544 tons of ore worth \$16.92, as per battery assays.

POTOSI.—On the 930 level the east crosscut from the winze is out 200 feet; face in clay and porphyry. The winze is down 124 feet on the incline below the 1300 level and has about 40 feet farther to go on the slope to reach the 1400 level. The bottom is in clay and porphyry with streaks of quartz. East crosscut from winze, 1300 level, is out from footwall 18 feet; face in porphyry with streaks of quartz yielding assays from \$7 to \$10 a ton.

UTAH.—On the 725 level the northwest lateral drift from the shaft has been extended 47 feet, total length, 573 feet, passing through vein porphyry showing clay and very little water.

GOULD & CURRY.—800 level: Have extracted from old stopes during the week 56 cars of ore of fair quality.

BEST & BELCHER.—800 level: All work on this level has been suspended. 1100 level: Started an east crosscut from top of raise from 1200 level; extended same 12 feet; face in hard porphyry. West crosscut No. 1, 100 feet above 1200 level, has been extended 10 feet; total, 172 feet. Face in quartz and porphyry.

ANDES.—On the 420 level have been repairing a portion of main north drift. The north drift on this level was extended seven feet; formation quartz, clay and porphyry. Work has been resumed in face of east crosscut from south drift on 425 level.

Columbus District.

HOLMES.—Chloride *Belt*, March 14: Captain Nelson Westcott has been appointed assistant superintendent for the Holmes M. Co. and for the Candelaria Water Works & M. Co.; also for all the properties belonging to and controlled by the Duris Syndicate in Nevada, and he has full power to act as superintendent in the absence of the superintendent, D. H. Jackson. Ten stamps were dropped in the Holmes mill yesterday morning, and ten more will be let down about Tuesday next. During the six days in which the mill was shut down it has been thoroughly overhauled and needed repairs made. Two new roasting furnaces have been rebuilt from the ground up. The one in operation works very satisfactorily.

Taylor District.

MONITOR.—White Pine *News*, March 14: The rumor comes from Taylor to the effect that after the ore now extracted is worked the Monitor mine will be closed down indefinitely and all work will be concentrated in the future on the Eberhardt-Monitor Co.'s property at Eberhardt. But two weeks ago all reports agreed that the Monitor mine had at no time looked better in several years. If the above rumor is founded on fact it is like unto a flash of lightning out of a clear sky.

Tuscarora District.

NEVADA QUEEN.—Times-Review, March 13: North drift on the 650-foot level has been advanced 21 feet in the vein; water has increased.

NAVAJO.—Stopes above the 350-foot level have been improved considerably and are now in good ore.

BELLE ISLE.—The 350 stopes continue to produce a high grade of ore; 12 cars of rich ore and 19 cars of concentrating ore were broken. West crosscut, 450-foot level extended 14 feet. Spar seams are beginning to show in the face, which is getting quite wet. South drift from same has been extended nine feet and suspended.

NORTH BELLE ISLE.—North drift from Belle Isle 450 level extended 16 feet; the vein continues large with bunches of good ore. The 500 stopes continue to look well, and ruby ore is beginning to show in

the south end. No. 4 upraise from the 600 level has been extended 13 feet and will connect with the 500 level in a few days.

COMMONWEALTH.—East crosscut on the fourth level has been advanced 12 feet into the vein. Progress has been slow on account of having to catch up the footwall side of the vein where the water started it to cave; face is in vein showing clay with mineral mixed through, giving low assays. Water continues to come as strong as at any time. West crosscut advanced 33 feet and timbered; face is in vein formation with heavy clay seams, slight seep of water.

NORTH COMMONWEALTH.—Second level—North drift from west crosscut extended 25 feet in the vein, assays from same \$120 per ton. Hoisted during the week 13 cars first-class ore assaying \$248 per ton, and 32 cars second-class, average assay \$26.90 per ton.

Jersey District.

BLOSSOM.—*Central Nevada*, March 14: S. W. Surgeon, who departed yesterday from Jersey mining district, took with him a large supply of provisions for the Blossom Mining Co. Four partners of them are taking ore from their mine in the district, which shows \$50 in silver and \$8 in gold. Average assays as high as \$123 silver and \$26 gold have been recorded. The Jersey district and the old townsite are 50 miles south of this point and 25 miles west of Bridges station. Hereafter the ores will be hauled by team and shipped from Battle Mountain.

Lovelocks District.

ANTIMONY MINE SOLO.—*Silver State*, March 13: The Theis-Hutchins antimony mine at Lovelocks changed hands yesterday, and the deed was placed upon record in the County Recorder's office. They received \$8000 in cash and is to receive \$2000 more in a short time. They claim this antimony ore will sell in the London market for \$115 to \$125 per ton.

ARIZONA.

MOHAVE COUNTY MINES.—*Miner*, March 14: Now is the golden hour for prospectors to hunt for the precious metals in Mohave county. The recent rains have washed a great deal of soil down from the hills, exposing in many places pieces of float rock and ledges heretofore buried in their depths. This county at this season of the year is a land of promise to the hardy seeker after the wealth of the earth. In the Black range, running for miles parallel with the Colorado river, can be found ledges rich in silver and gold. In the Cerbat range of mountains the mineral-bearing belt is seven or eight miles wide and about 80 miles in length; and in the Wallapai, Music and Peacock mountains are buried treasures more vast than ever dreamed of by mortal man awaiting the day when the horny-handed sons of toil shall liberate them from their earthly tomb. Nearly every metal known to science exists in some form in our mines, so that from the prospector after "black-som" to the one after bright, sparkling gold, each and every one can have his choice. The water has at last been overcome in the Cupel mine and sinking commenced. Darden, Shippey and Sherick have a carload of ore ready for shipment on the dump of the Empire at Chloride. The Empire mill in Todd Basin is running on ore from the Suffolk mine, and seems to be turning out considerable bullion. The Denver M. & M. Co. have had between 80 and 90 tons of Mexican ore worked in the Empire mill, Todd Basin, which gave satisfactory returns. There is a strong possibility that work will soon be resumed on the Montezuma mine in the Black Canyon range. The Homestake mine in Mineral Park, it is said, is proving itself a good property, as the ore is getting richer than ever. The ore now being taken from the bottom of the shaft averages between \$300 and \$400 per ton. Beebe's team took the new Ingersoll drill for Barry & Baldwin out to the Sunlight mine, last Saturday. Del. Beebe made a flying trip to the Diamond Joe mine the first of the week. He informs us that there are now about 150 tons of ore on the dump of the mine awaiting shipment to the sampler. This lot of ore will average over 100 ounces to the ton.

OLIVE CAMP.—*Cor. Tucson Citizen*, March 14: Work at the Sierrita mine, under the superintendence of Mr. Rhodes, has been suspended. The work ceased Sunday morning, and the cause is only matter for conjecture. The men were paid off, and do not, so the *Citizen's* informant states, know whether the shut-down is permanent or otherwise, though they think it is not unlikely that it is for the time only, when new machinery—concentrating—will be put in. There is plenty of good ore in all the levels. The ore has been shipped as fast as mined, and in the main shaft has reached a depth of 235 feet. The Olive mine has been leased to Messrs. Frank Shey, Chas. Avery and — Fogerty, and they are taking out fine ore—silver and lead—much of it better than 250 ounces to the ton. At the Matchless, owned by Messrs. Taylor, Scott, Hughes and Baxter, shipments are being made regularly. The ore runs over 200 ounces. Two men are hired there. A shipment was made last week from the Wedge mine. This is a good property and development work on it will be pushed constantly. The old whim at the Sierrita has been purchased and is being put in. Five men are employed there. Three Italians are taking out some fine ore on the west end of the Wedge, at a mine they have lately opened there. They have gone just through the blue and will ship soon. O. J. Doyle, the Olive postmaster, is working three men on the Annie. He made a carload shipment of graded ore about three weeks ago. Some of the ore went \$395 to the ton. The Richmond has lately been leased to a Tucson party named Carruthers who went out there this morning. He leased it of Mr. Royce. L. F. Fries has a nice little mine at Olive with four feet of ore. It runs from 150 to 250 ounces, and his occasional shipments furnish a good income. Much chloriding is being done throughout the Olive country.

BRITISH COLUMBIA.

KOOTENAY LAKE COUNTRY.—*Cor. Nelson Miner*, March 14: I believe that Toad mountain will turn out to be like Leadville's Carbonate hill; that ore will be found in almost every shaft sunk. I have been on the mountain off and on since 1888, and have been all over the Silver King and Kootenay Bonanza ground. You can hardly stick a pick in anywhere on part of the ground without uncovering ore. If machinery was on the Silver King mine,

fully 250 men could be working to advantage, even though the present depth is but 150 feet. As it is, 50 men could now be employed at stopping ore alone. Fifty men in the Silver King could extract 100 tons a day. The ore body is exposed for a distance of 100 feet; in one place it is shown to be 45 feet wide and neither wall struck; the shaft shows this body or deposit to be 35 feet deep with solid ore in the bottom of the sump. Estimating that it is only 100 feet long, 45 feet wide, and 35 feet deep, would give 157,500 cubic feet of ore, which at 13 feet to the ton is 12,115 tons. The lowest value placed on the ore would give over a million dollars in sight in this one place alone. There is also a large quantity of lower grade ore near the surface.

COLORADO.

AROUND GEORGETOWN.—*Courier*, March 14: Very little can be said in a mining way this week except that the shipments of ore have not been as brisk as they might had the weather been more propitious. The mountain trails are in a poor condition from the almost incessant fall of snow of the past two weeks. And yet one can see the trains of those much-abused and invaluable little burros wending their way up the almost impassable mountain-sides daily, regardless of the inclemency of the weather, to the mines that cannot be reached by wagon-road, and returning heavily laden with ore. The shipments from the station will be a great deal less than last month, not that the mines have produced less, but on account of the very disagreeable weather prevailing. Up in the Argentine districts, better named the Arctic, the snow is so deep that the miners of that Siberian clime are hibernated. The mines in and around Georgetown and Silver Plume are so situated that they are come-at-able during all seasons of the year, hence almost every available foot of ground has been located.

MINERAL FARM.—*Aspen Times*, March 14: The prospects for the Mineral Farm are more and more encouraging. The recent discovery of boulders of rich ore has been followed by the development of some mineral in what appears to be a permanent streak, which becomes more important as the incline goes down. The work progresses without any hitch, and we may look for some interesting news from that quarter in a short time. The improvement is so well maintained that the management is encouraged to believe that an ore chute is being approached. A strike in that property would be of the greatest value to the camp, as it would carry the paying district northward nearly a mile.

SILVER BRICK.—There is a report on the street to the effect that a strike of good ore has been made in the Silver Brick at the foot of Smuggler mountain. This claim lies just east of the Smuggler. Nothing is known of the character of the discovery, but the report of the find is coupled with another that \$60,000 has been offered for the property.

AROUND SILVERTON.—*Standard*, March 14: On the Syracuse Pride, two feet of mineral has been struck in the lower level just under the big ore body above. The force has commenced stopping and finds that both the grade of mineral is much better and the streak much larger. The crosscut on the Pride of the West is being pushed ahead at an average rate of five to six feet a day. The power drills are working to perfection. Some days two headings are put in and in hard rock only one; each heading squares up four and a half feet. The contract for sinking the shaft of the Silver Ledge is about completed. Gottlieb Wagner, who is contracting on the south drift, is in 60 feet and Peter Bataleno is in 40 feet in the north drift; each has a contract for 100 feet. They have ore in both drifts and the mine is looking well. Theising Bros. have just completed a 60-foot crosscut on the Custer Extension, on Galena mountain, on the south side of Cunningham gulch. After cutting the lead, which shows 18 inches of solid mineral—galena, copper, gold and silver—they commenced sinking a shaft and are down 10 feet, with mineral improving. They will sink 50 feet, and in the spring run another tunnel 100 feet below the present one and raise to make connections with the shaft.

DAKOTA.

HILL CITY.—*Deadwood Pioneer*, March 13: With the Harney Peak Co. capitalized at \$15,000,000, with over 1000 mining claims surrounding it in every direction, it is no wonder that Hill City is putting on metropolitan airs and keeping pace in improvements with many older towns in the Hills. The vast sums of money the Harney Peak Tin M. Co. has disbursed in the purchase and development of their mines has built up the city, and the new mill of 250 tons daily capacity that will be erected the coming spring will settle the tin problem and make Hill City the tin metropolis. While there are none of the company's mines down to a depth of 300 feet, they are sinking steadily on the Cowboy, Addie, G. W. Coates and the Nevada No. 2. These claims are provided with steam hoists, pumping and compressed-air machinery of capacity for working to a depth of over 500 feet. Numerous tunnels, the longest of which is 950 feet in length, are being run, and the dumps show an abundance of ore. The finest of this comes from the Cowboy and Addie. The largest tin crystals ever discovered in the world are from the former mine. Hill City is growing substantially.

IDAHO.

PROSPECT.—*Elmore Bulletin*, March 14: Dave Barclay has a good prospect adjoining the Keystone claim on the Red Warrior side of the ridge south of town, which he calls the Little Daisy. He has recently shown us some specimens of very rich gold ore from this claim, and though the vein where exposed is small, it certainly justifies thorough development. Mr. Barclay will soon commence extracting ore from the Little Daisy, and will doubtless make several millruns during the coming summer.

PINE GROVE.—Superintendent Towne is actively engaged in preparations to resume work on the Pine Grove Co.'s mines. The stamps of the Elmore mill have been making music and grinding out gold the past week.

FROM SMOKEY.—*Cor. Ketchum Keystone*, March 14: As to mining matters of the camp, work has been prosecuted with the same energy and force as

was started in with last fall, with results more or less favorable. The King of the West is looking remarkably well, though only working a small crew of men. Mr. Dell Shearer has struck a good streak of ore on his Sunday lease. The Silver Star continues to take out a quantity of high-grade ore, besides its milling ores. About the old town of Smoky proper, the two leases are still under headway. Messrs. Oliver, Jones & Turner have taken out a small quantity of ore during the winter, and continue to strike pockets as they go on. They have had much water and ice to contend with. Messrs. Covert & Reid are still prospecting their strike of last January, and when they commence stopping it is fair to presume that they will take out a good-sized bunch of high-grade ore.

MONTANA.

THE EUREKA.—*Phillipsburg Mail*, March 12: The Eureka G. and S. M. Co., whose property is situated near Georgetown, is prepared to begin work just as soon as spring opens and the road to the property becomes passable. The necessary machinery for doing the development was taken in last fall, and they intend making extensive development this year. This company is made up almost exclusively of Phillipsburg gentlemen and capital.

DRUMLUMMON OUTPUT.—The output of the Drumlummon for the month of February was as follows: Fifty-stamp mill, 338 tons, valued at \$65,300; 60-stamp mill, 2600 tons, valued at \$23,300; total, \$88,600; running expenses, \$53,200; profits, \$35,400.

BI-METALLIC EXTENSION.—The excessive flow of water in the Bi-Metallic Extension shaft caused some delay in the work early this week, but larger pipes have been put in and work is again under way.

GRANITE MOUNTAIN OUTPUT.—The output of the Granite Mountain Co. for the past week is 39 bars containing 58,500 ounces silver and 240.4 gold.

BLUE BIRD.—*Butte Miner*, March 12: The litigation which caused a total suspension of operations at the Blue Bird mine for nearly a year and deprived many laborers of employment, besides paralyzing for a time the earning power of a vast amount of invested capital, has just been settled out of court, and upon terms which permit the immediate resumption of work at the mine and mill owned by the big English company. This announcement will cause great satisfaction to the laboring miners as well as to the business men of the city, and the effect of the resumption of operations at the Blue Bird mine will be beneficial to the entire community. The 325 men who were thrown out of work by the shutting down of the mine and mill will once more draw pay, which means that over \$30,000 is to be added monthly to the amount now paid out for labor by the mining companies of the camp. The settlement was effected yesterday, when the Blue Bird Co. purchased of James A. Murray all his right, title and interest in the claims immediately adjoining and surrounding the Blue Bird. Mr. Murray received \$10,000 in cash and accepted the company's notes for \$50,000 more for his interests, and an agreement that both parties should withdraw their suits was signed.

THE ANACONDA.—*Butte Inter-Mountain*, March 14: This mine must always head the list when the great red metal producers are under discussion. The shaft is now down just 1000 feet with stations cut at every 100. Drifting and stopping are being pushed on nearly all the levels. The levels above have been considerably worked and much of the ore has been taken out, though there yet remains enough in sight to last for years. There are employed in the mine about 420 men above and below. The most ore at present is being taken from between the 600 and 900 foot levels. On the 1000 of this property the ore body is about 20 posts in width, or about 100 feet, but the ore contains more iron than that nearer the surface. The ground at the 1000-foot level has been completely prospected, and at every point the indications are bright for a great and continuous future. On the surface the company has machinery that is capable of sinking to a greater depth when required, but that will be many years hence. The most of the drilling is done by Burleighs, more especially in the stopes and drifts, but in some places hand-drilling is resorted to where it is impossible to get in the pipes. The timbers used in the stopes are 10x10, and those in the stations are 12x14. These timbers are pulled into position in the stopes by a little engine that is taken about the mine on trucks and which is run by compressed air. This mine now fills up all its old stopes with waste that is procured from the country rock adjoining and from a distance. Should these places come together now it would work no injury to this large property. In some places where it is impossible to get a sufficient amount of waste, the old stopes are bulkheaded up with heavy timbers. The company puts in the timber only where it is impossible to procure the waste, as the latter is the only safe way of securing the ground in this camp. It is almost impossible to picture the immense quantity of timbers used in this way.

NEW MEXICO.

GOLO.—*Silver City Enterprise*, March 13: The cleanup from ten stamps on Pacific extension ore, the property of Bell & Stephens, three weeks run full time, amounts to just 150 pounds of gold. Who says that stamp milling will not pay when conducted properly, judiciously, economically and skillfully in Pinos Altos?

SILVER-LEAD.—Great activity is now going on, particularly in silver-lead properties below the Pass. The Cooke Bros. and Bob Williams, Tom Fox and others have at present showing the biggest lead ledges. Experts from El Paso are in camp every week trying to secure the lead output. The lead ores average about 30 per cent and carry 20 ounces and upward in silver.

COPPER.—Capt. P. J. Mitchell, M. E., in charge of the development work on the Johnny Bull mine at Stein's Pass, reports that during the month of February while cutting out stations, putting in stulls and finishing timbering work on the 70-foot level, a body of copper ore was exposed and stopes cut out for over 50 feet in black and red oxides and carbonates. The vein is 18 feet wide as far as opened out, and as yet shows no signs of any hanging-wall. In addition to this body of ore there is also a 15-foot

body of carbonates showing some red oxides at the depth of 100 feet in the shaft on the hanging-wall side of the line formation and as yet shows neither signs of hanging nor foot wall.

LONE MOUNTAIN.—Brockman and Beall yesterday shipped another carload of high-grade ore from the Good Luck. They have also located and are developing another claim to the north of the Good Luck, which is a promising prospect for the amount of development work done on it. There has been a great deal of excitement in mining circles during the week, about the strike made last Saturday by Wm. Brahm and Doc Belt. An *Enterprise* representative visited the mine and found the ore body fully as large as represented, being fully 20 feet in width. The ore is an iron and lead carbonate containing silver as a chloride; first-class samples showing over 300 ounces per ton. If the mass of ore will average one-half or even one-fourth of this, the gentlemen will be well entitled to their recently acquired titles of "Bonanza Bill" and "Silver Dollar Doc."

OREGON.

PLACER MINING OUTLOOK.—*Bedrock Democrat*, March 12: Mr. A. Reiney, a prominent placer miner of Humboldt basin, was yesterday met by our reporter and in response to a question propounded as to the placer-mining outlook in that section the gentleman replied: "Last year was the best placer season that we have had for the past five years. More ground was worked and with better results than usual, all on account of a good supply of that ever indispensable article—water. The deep snows in the mountains furnished a good supply of water and fed the streams until late in the season, and that is the reason why the season was so long and profitable. At present we have about three feet of snow in the basin, and now, getting at your question, I will say that the coming season promises to eclipse that of last year. Every one who owns a piece of placer ground in our section will be up and doing when the season opens, and as we have every assurance of a good water supply and a long season, you can depend on the output of the shining metal being greater than for any season for the past eight years. Among the placer miners who are preparing for the spring run I might name the following: Colt Bros., owners of valuable placer diggings near Canyon creek, are preparing for a long run. Littig & McCarty will work their ground on Gordon Bar. Lum Sing & Co. will work the Rogers & Copland places, north of City Gulch, for all they are worth. Andrew Jensen is preparing to commence operations on valuable placer grounds, situated on Glenn Glory. Blair, Glover & Seigel will make the dirt fly on their Amelia placers and they expect a long and profitable season."

UTAH.

MINING AT FISH SPRING.—*Salt Lake Tribune*, March 12: James Chipman and W. H. Grant of American Fork have gone into mining quite vigorously at Fish Spring. They have two feet of ore and have taken out so much of it as to start shipping. A number of teams were started out the other day to bring this ore to market, and it is expected to keep teams on the road steadily. They have had many assays made and the lowest went over 100 ounces silver and 25 to 40 per cent lead. Near their mine is another in which James Preslin of American Fork has purchased an interest, and it runs still better in the quality of the ore. Assays made show all the way from 96 to 700 ounces silver and 25 to 56 per cent lead, the lead being the highest where silver is the lowest.

THE BUFFALO BILL.—J. J. Cushing and Fred Gillette have a small force of men developing the Buffalo Bill mine, this side of Tintic, a short distance from the Salt Lake & Western Railway. They have a tunnel driven on the six-foot vein of low-grade ore, and it is developing so well that they will incorporate a company in a few days to prosecute work more vigorously on it.

AMERICAN FORK.—S. Osborn, who is interested in several mining properties in American Fork canyon, writes from Chicago that he has secured money for their development and associated good men with him in the enterprise, and that about April 1st he will be here to push work. He says his work this season will boom American Fork district and make it a large producer of ores. T. B. Many of Cleveland, Ohio, who has a lease and bond on the Sunday mine, American Fork canyon, writes that he will soon be here to work the property, and will drive development with much vigor this spring and summer. The Treasure Con. Co. has had three men doing deadwork on their property in American Fork canyon all winter. Their property adjoins the well-known Miller mine. They have ore ready to ship.

THE NEW EAGLE DISTRICT.—The Midland Investment Co. is in receipt of a letter from its foreman, whom they sent, with several other men, to the Deep Creek country some time ago, and who located five claims in the new district of Eagle. The foreman writes that in sinking on these five claims, the vein gets better and the ore richer as they go down, but have not reached deeper than 12 feet on any of them. They have located several other claims the past month.

THE OLD MASSACHUSETTS.—*Park Record*, March 14: A recent transaction that gives great encouragement to a large number of Park City residents, who long have had faith in the ultimate richness of the Massachusetts mine, is the fact that Messrs. M. R. Evans, Wm. M. Curtis and A. A. Smith have closed negotiations with the principal stockholders of the Massachusetts M. Co. to obtain the control of that property, which was done at the meeting of the directors of the company held in Salt Lake on Saturday. Mr. M. R. Evans of Salt Lake City has secured the control of two-thirds of the stock, and it is his intention to develop the property as soon as roads and weather will permit. The shaft, which is now down about 600 feet, will be sunk to a distance of 1000 feet, when drifting for the vein will be started. All the machinery necessary for that purpose is on the ground, and but little delay will be occasioned. Mr. Wm. M. Curtis, late superintendent of the Anchor, and who had charge of the Massachusetts when last operated, will be placed in charge of the work. The revival of the Massachusetts, with such a strong backing of thorough miners, will undoubtedly redound to the credit of all concerned.

MECHANICAL PROGRESS

The Mannesmann Process Fore-shadowed.

That there is nothing new under the sun is proved by every-day experience, and if the Mannesmann tube process has not been anticipated, it has at least been foreshadowed. This is the experience of F. J. R. Carulla, formerly manager of the Landore Siemens Steel Works, who points out in a contemporary that Messrs. Dyson and Hall invented what they called a reeling machine, which was worked at Sheffield. To quote Mr. Carulla:

"Just over 20 years ago—viz., on Oct. 31, 1870—a patent was granted to George Walter Dyson and Henry Arthur Hall for 'improvements in rolling and finishing circular metal plain or irregular rods and tubes,' which as regards rods has had a considerable local application in Sheffield, especially at the Carbrook Forge, where the invention was first brought out. As regards tubes, it may be said, without in the slightest degree detracting from the ingenuity and originality of Messrs. Mannesmann, that the germ of their already famous process is evident in this invention. As the Mannesmann process, at no distant date, is likely to revolutionize the tube industry, any analogies that may assist in understanding its mysterious operation will not fail to be of interest, but apart from this, the machine of Dyson and Hall, which, as already hinted, has been mainly applied to the cold-rolling of 'rods' or round steel bars, is so little known that no doubt it will be thought worthy of description for its own sake.

"The name 'reeling' has been given to the operation performed by this machine to distinguish it from that done by parallel rolls where the bar is simply passed backward and forward without having any rotary movement imparted to it. The rod to be operated upon is, in the reeling machine, passed between conical-shaped rollers—truncated cones projecting from the faces of discs fixed at the ends of shafts or axes, the combined arrangement being called a 'reel.' . . . This action gives a spiral motion to the bar under operation that makes it travel between the coned faces of the reels, fresh portions being brought under action in a similar manner to that of the Mannesmann mill. The resemblance of ideas in the two cases is also obvious when the means for holding the piece to be operated on are compared. . . . Dyson and Hall specify 'the rod or bar is prevented canting during the rolling by snitable guides, or it may be made to pass through the mouths of tubes arranged at the ends for the purpose, or between rollers which may be feed rollers or not.' The reels can be moved end on toward one another, and the discs approached or separated to suit different diameters by means of hand wheels and screws.

"The bars subjected to this operation come out straight and perfectly circular in section, no turning being necessary where a plain bar all of one diameter is required. Not the least important effect, however, is the toughening produced on the material of the bar by the spiral compression, the tensile strength being increased over 20 per cent in the case of mild steel. The spiral fiber is the very essence of the remarkable strength of the tubes made by the new process now in operation at Landore. Dyson and Hall specify that 'there is no limit to the dimensions of the discs, as those can be suited to the size of the articles to be produced or finished, and discs of different sizes can be used as pairs, and these may travel at the same or different speeds.'

"We can imagine that some conception of the possibilities of their process as recently developed had crossed the minds of our inventors, when we read: 'We have referred more particularly to rods or bars, but tubes can be acted upon in the same manner, whether for rolling or finishing them as before spoken of.' But no doubt the difficulties of obtaining sufficient power, which have been successfully overcome by Messrs. Mannesmann, stood in the way of progress in the direction indicated.

"The writer well remembers one occasion during his connection with the Carbrook Forge when a breakdown occurred, which was sufficient to render every one cautious of further experiment with the appliances then at command. One other distinctive feature of the reeling machine which also assimilated it to the Mannesmann mill is—as Mr. Gordon states for the latter—that much greater accuracy is required in the adjustment of the rolls than is dreamed of in the philosophy of iron and steel millwrights. The parts in the machine, as in that described by Mr. Gordon, are as accurately fitted as those in a locomotive or marine engine. The reader will not fail to perceive the numerous points of resemblance between the two processes. At the same time, let it be understood that it is in no spirit of detraction that these lines are written, but simply as a contribution having a wide interest in connection with an ingenious process that is likely to become an important adjunct to our industrial resources."—*London Iron*.

PROTECTION AND BESSEMER STEEL.—That our protective system has done something substantial for our iron production has been shown. The record as to Bessemer steel makes equally instructive and significant reading. In 1878 the United States produced a little over 800,000

net tons of Bessemer steel, with Great Britain slightly in the lead. In 1889 Great Britain turned out, in round numbers, 2,400,000 tons, having increased 200 per cent. During the same year our total production was 3,800,000 tons, a net increase of 375 per cent. The figures for 1890 are not yet obtainable, but will no doubt increase our lead. The production in Great Britain was only limited by the demand, for her manufacturing resources are almost boundless. But for our protective system, she would have supplied us, thus more than doubling her output. When we consider what a vast amount of labor is required to produce 3,800,000 tons of steel, who can have the effrontery to say that as a nation and a people we have not been immensely, almost incalculably, benefited by our system of protection to American industries? The McKinley bill may have made some unfortunate changes, but the fundamental principle of protection is founded in reason and demonstrates itself.—*Chicago Jour. of Com.*

The Age of Steel.

Steel has been selling at Pittsburg at a less price than iron. This bit of news, which comes to us upon good authority, justifies the statement that the much-talked-of "age of steel" has at last arrived. The statement, which to many would seem to involve an absurdity, is reasonable enough to the initiated. One of the greatest expenses of manufacturing iron consists in the large amount of labor required, a considerable portion of which is of a highly skilled character, commanding in consequence good wages. Skilled labor is also required in making steel, but the number of men of all grades required to operate a plant of given capacity is small in comparison to running an iron-mill with same output in tons.

For some purposes, the manufacture of electrical machinery and appliances for instance, iron can never be supplanted by steel, but for most uses the latter is far superior and can be made to generally take the place of the former. But iron is not destined to yield the crown without a struggle. Recent inventions have cheapened the production of bar iron and a still further reduction in cost seems highly probable. Much iron of good quality is now made direct from the ore, or rather about 50 per cent of ore is used in connection with an equal quantity of pig. A mass of ore is suspended above an ordinary open hearth in which is a bath of iron made from the pig metal. The heat wasted in the ordinary process serves to heat the ore to a dull red color. This drives off most of the deleterious matter, after which it is allowed to descend into the bath, producing very good iron.

This and other devices may somewhat retard the triumph of steel, but none the less certainly it seems destined to come, and that in the near future. Cheap steel will work wonders for this country and enable us in due time to compete with the manufacturers of the world, and that on an equal footing.—*Chicago Jour. of Com.*

Wire Rope.

A wire-rope manufacturing company gives the following hints:

There are two kinds of wire rope manufactured. Ropes with 19 wires to the strand are more pliable and are generally used as hoisting ropes. Those with twelve or seven wires to the strand are stiffer and best adapted for guys, ferries, rigging and transmission purposes. Wire ropes are made of six strands, laid about a center of hemp or wire, the former being more pliable, and wearing better over small pulleys and drums.

Wire rope is as pliable as new hemp rope of the same strength. The greater the diameter of sheaves, pulleys, and drums, the longer the rope will last.

For safe working load, allow one-fifth to one-seventh of ultimate strength, according to speed and vibration. Speed increases the wear.

Wire rope must not be coiled or uncoiled like hemp rope. When not on a reel, roll upon the ground like a wheel to prevent kinking.

To preserve wire rope, cover it thoroughly with raw linseed oil, mixed with vegetable tar. This mixture forms a protecting surface and preserves it from undue wear.

To preserve wire rope under water or underground, add one barrel of fresh-slacked lime to a barrel of mineral or vegetable tar, hoil well, and saturate the rope with the mixture hot.

Galvanized wire rope should never be used for running rope. One day's use will wear off the coating of zinc, and the rope will soon rust.

Too much care cannot be taken with the pulleys, sheaves and drums over which ropes are run. The grooves should be lined with well-seasoned blocks of hard wood set on end, rubber, leather, or some soft metal. Thus the life of the rope will be greatly lengthened, and greater adhesion secured than when the rope is operated over smooth and hard surfaces.

Iron ropes, operated under proper conditions, will give perfect satisfaction when the work to be done is not too heavy. Steel ropes should be substituted for iron when lightness is required, or when a greater strength becomes necessary. The object in substituting steel for iron is to decrease the wear rather than reduce the size of the rope.—*The Engineer*.

A CONVENIENT DEVICE.—Near Bordeaux, France, there is a buoy in the harbor which is connected with the mainland by telephone. Ships arriving can thus communicate with their owners.

SCIENTIFIC PROGRESS.

UTILIZING WASTE FURNACE PRODUCTS.—At three or four of the Scotch iron works, the Furnace Gases Company are paying a yearly rental for the right of collecting the smoke and gases from the blast furnaces. These are passed through several miles of wrought-iron tubing, gradually diminishing in size from 6 feet to about 18 inches, and as the gases cool there is deposited a considerable yield of oil. At Messrs. Dixon's, in Glasgow, which is the smallest of these installations, they pump and collect about 60,000,000 feet of furnace gas per day, and recover, on an average, 25,000 gallons of furnace oils per week; using the residual gases, consisting chiefly of carbon monoxide, as fuel for distilling and other purposes, while a considerable yield of anhydrous ammonia is also obtained. In the same way a small percentage of the coke ovens are fitted with condensing gear, and produce a considerable yield of oil, for which, however, there is but a very limited market; the chief use being for the Luogen light and other lamps of the same description, and also for pickling timber for railway sleepers, etc. The result is that four years ago the oil could be obtained in any quantity at 3d. per gallon, though it has since been as high as 2s. 6d. It is now about 2d. per gallon, and shows a falling tendency. Make a market for this product, and the supply will be practically unlimited, as every blast furnace and coke oven in the kingdom will put up a plant for the recovery of the oil. As, with the limited plant now at work, it would be perfectly easy to obtain 4,000,000 or 5,000,000 gallons per annum, an extension of the recovery process would mean a supply sufficiently large to meet all demands.—*The Engineer*.

CHEMICAL ANALYSIS IN METALLURGY.—As is well known, chemical analysis demands the greatest precision, and therefore every addition to the supply of information on the subject is to be welcomed. A work has just issued from a forge addressed to those engaged in metallurgy, written by Baron Hansjupner de Jousorff, which has been translated into French. In reviewing it, a Parisian contemporary says: This practical treatise of metallurgical chemistry will be appreciated not only by those who are occupied in that particular branch of analysis which relates to ores and metallurgical products, but also to those who are interested in the apparatus and metallurgical processes, in refractory products, in blending beds, in different heatings, in ovens and furnaces, and in the analyses of gases. The translator shows how useful a chemist may be in such works. Some years since, he says, a laboratory was only kept up from vanity, as an object of luxury showing the scientific culture of the manager. The war forced our engineers to push as far as possible the study of steels, and that study cannot be fruitless without very delicate chemical analyses. They made themselves *au courant* with the laborers of Lowthian Bell and Bessemer and with the methods of analysis which had contributed so largely to the success of the Kruppa. To-day we are on a level with the Germans and the English, if, occasionally, even we do not succeed in surpassing them at least on some points.

FROZEN 6000 FEET DEEP.—For many years scientists have been perplexed over the phenomena of a certain well at Yakutsk, Siberia. As long ago as 1828 a Russian merchant began to sink this noted well, and, after working on it for three years, gave it up as a bad job, having at that time sunk it to a depth of 30 feet without getting through the frozen ground. He communicated these facts to the Russian Academy of Science, which sent men to take charge of the digging operations at the wonderful well. These scientific gentlemen toiled away at their work for several years, but abandoned it when a depth of 882 feet had been reached, with the earth still frozen as hard as a rock. In 1843 the academy had the temperature of the soil at the sides of the well taken at various depths. From the data thus obtained they came to the startling conclusion that the ground was frozen to a depth exceeding 6000 feet. Although it is known to meteorologists that the lowest known temperature is in that region of Siberia, it is conceded that not even that rigorous climate could force frost to such a great depth below the surface. After figuring on the subject for over a quarter of a century, geologists have at last come to the conclusion that the great frozen valley of the Lena river was deposited, frozen just as it is found to-day, during the great grinding-up era of the glacial epoch.

SNOW WORMS.—We alluded in our last issue to the appearance of what were called "snow worms" in Randolph county, West Virginia. The great of the snow was covered with them. The *Scientific American* wrote to Prof. Riley, the agricultural entomologist at Washington, for an explanation of the phenomena, who replied as follows: "You send two distinct larvae. The small species, of which there were 8 to 10 specimens, is the common Pennsylvania soldier-beetle (*Chauliognathus Pennsylvanicus*), a carnivorous species which in the larva state destroys plant lice, bark lice and the eggs and young larva of a number of injurious insects. This insect hibernates in the larva state and has occasionally been observed, both in Europe and in this country, fairly awaking upon the surface of snow, having been driven

from its hibernating quarters by some peculiar weather combination. It hibernates at the roots of grasses, under stones and logs, and under the loose bark of stumps, logs, and old trees. The other and larger larva, of which there was only one specimen in the box, seems to be a variety of the bronzy cutworm (*Nephelodes violans*), an insect which also hibernates in the larva state, and has also been observed occurring in large numbers on snow."

COLD WATER WITHOUT ICE.—The following method of obtaining a constant supply of cool water at all times is described by the *Railroad and Engineering Journal* as being in general use in Hanover, York county, Pa. The water from the wells is unfit to drink on account of bad drainage, so water has to be brought a long distance in pipes, which is very warm. To cool it, a plan has been adopted which is quite ingenious. A galvanized tank is placed beneath the water in the wells, which is very cool. This tank is connected with the water mains and the domestic delivery pipes, and the method gives an abundant supply of cool water during the whole summer, and can be adopted in all cities, towns or in the country. If a well is available, it can be used; if not, by simply digging a hole in the ground deep enough so as not to be affected by the surface temperature, and burying the tank, it will answer equally well. This hole might be dug in a cellar or outside the building. If the water has any impurities in suspension, such as mud, the tank should be made accessible, so that it can be cleaned separately.

HOW THE WORLD APPEARS TO THE LOWER ANIMALS.—In addition to the organs of hearing, touch and smell, Sir John Lubbock has found upon the antennae of insects certain organs that seem to be connected with senses that we know nothing about. Experiments made upon certain fresh-water crustaceans show that they are sensible to sounds corresponding to more than 40,000 vibrations per second (sounds that we cannot hear), and to ultraviolet rays that we cannot perceive. Now all the rays that we can perceive appear to us with definite colors, and it is almost the same with these animals; so it is probable that they see colors unknown to us, and which are as different from those that we are familiar with as red is different from yellow or green from violet. It would result from this that natural light, which seems white to us, would appear colored to them, and that the aspect of nature would be entirely different to them from what it is to us. It is possible, therefore, that to certain animals, nature is full of sounds, colors, and sensations that we have no idea of.

ELECTRICAL STORMS.—An electrical storm of unusual violence visited South Dakota about the first of February. During the storm, the large amount of electricity was noticeable everywhere. Persons coming in contact with each other or with any metallic substance would throw off visible flashes of electricity with a sharp, snapping sound. When this occurred to persons a very perceptible shock was experienced, even through thick clothing. Commenting upon this phenomenon, the *Scientific American* correctly says: "The phenomena described were those of a winter electric storm. These storms are not frequent, but they are well understood by meteorologists. They are also called magnetic storms, because the magnetic needle is strongly affected during such electric manifestations. Their origin is supposed to be coincident with the development of aurora, and probably caused by disturbances in the sun that produce sun-spots. Their coincidence has often been the subject of astronomical observation and record."

EFFECTS OF HEAT AND PRESSURE ON ROCKS. M. Daubree has continued his researches on the effects produced upon rocks in contact with gases suddenly developed by means of such explosives as gun-cotton and dynamite. Temperatures of 2500° and pressures of 1100 atmospheres, thus obtained, have been sufficient to fuse and pulverize the rocks experimented upon in a very marked manner. The results lead M. Daubree to believe that the perforated pipes or *diatremes*, diamantiferous, volcanic, or otherwise, and much of the subaerial dust and oceanic deposits are formed by such actions as he has obtained in the laboratory. He also shows that rocks may acquire an apparent plasticity under the influence of pressure.

IN GREENLAND, north of 75° of latitude, the entire land is covered with a sheet of ice estimated to be about 5000 feet thick over all the valley regions. So far as has been observed, no mountains are discernible above the ice, or even any elevations which can be attributable to underlying mountains. The whole is a vast plain at an elevation of from 5000 to 6000 feet above the sea level. This is probably the last remnant of the great ice cap which must, at some time in the past, have covered nearly or quite all the land from the pole to the equator.

ARTIFICIAL RUBIES.—Some time ago mention was made in these columns that two French gentlemen, M.M. Fremy and Verneuil, had succeeded in producing rubies artificially, but the crystals were exceedingly minute. After long-continued study and experiment it is now announced that they have succeeded in continuing the process over several months, and producing as much as seven pounds of rubies at a single operation.

GOOD HEALTH.

Failure of a Noted Case of Skin-Grafting.

Some two or three months since Mr. John O. Dickerson, a prominent Mason of Chicago, had a cancer removed from his person by the knife. The wound refused to heal, and 132 of his brother Masons came heroically to his relief. Each allowed a piece of skin to be removed from his person, to be transplanted upon the body of the afflicted brother. The victim of cancer and the surgeon's knife died February 24th.

It is truly melancholy to know of the immense suffering and loss of life by this fearful cancer malady all over the country and the world. Over 2000 people are dying of this dread disease in the United States every month, and yet we have in this city a most undoubted cure for it, to which we have been calling the attention of our physicians and the people generally for some four years past, with very little response from either the physicians or the press, although great numbers of the people are becoming interested in the matter.

We have given masses of testimony of every character from patients that have been cured and from individual physicians who have watched the successful treatment of patients with more or less carelessness; but the faulty as a body have thus far refused to investigate or make any official report either for or against.

We are pleased, however, to state that several of the more considerate are beginning to give the cure some attention, and are watching the convalescence of several very pronounced cases now under treatment, and it is to be hoped that the result in those cases will lead to an official investigation by our City Board of Health or some other official body.

We have no interest in the matter, so far as the practitioner is concerned. The end which we desire to reach is such an official medical investigation as will place the value of the ascertained remedies beyond all controversy. If such investigation should prove favorable, there are those who stand ready to do whatever may be required to place the remedies in the hands of physicians everywhere. We hold that the evidence is amply sufficient to warrant the Board of Supervisors in asking the City Board of Health to look into this matter officially.

THE TREATMENT OF DANDRUFF.—Dr. Edward Clarke, in the *Lancet*, states that he has had good results in persistent dandruff from the following treatment: The scalp should first be thoroughly washed with soap and hot water and then thoroughly dried with a warm and soft cloth; there should then be rubbed into the scalp a glycerole of tannin, of the strength of 10 to 30 grains to the ounce. Very obstinate cases will require the higher strength of tannin. This process should be repeated twice a week at first, once a week afterward. If tannin fails, as it will in some cases, then resorcin is had to resorcin. After the formation of dandruff has ceased, the head should be rubbed daily with olive oil containing, to the ounce, ten grains of carbolic acid and a dram of oil of cinnamon.

THE MICROBE OF RHEUMATISM.—A distinguished French physician, after much research, thinks he has discovered a micro-organism, specific in character, which is the direct cause of rheumatism. He reports that he has isolated and cultivated the microbe, injected it into the carotid artery of rabbits, and engendered an inflammation which to all indications is the same which accompanies inflammatory rheumatism in human beings. These investigations will undoubtedly stimulate parallel researches by other investigators and may lead to important therapeutical results.

POISON IN WALL PAPER.—We have already called attention to the fact that there is danger of poison from wall paper, especially that which contains green colors, which are generally produced by arsenic. We see by an Eastern exchange that ex-Mayor Cobb of Boston is now suffering from what is pronounced an incurable illness attributed to the absorption of arsenical poison from wall paper in his own house.

PEPSIN IN PINEAPPLE.—It is stated that there is an element in the common pineapple similar to pepsin, and of such remarkable strength that the juice of a single apple will digest ten pounds of beef. It is further stated that the juice of the fruit is a very active solvent of the membrane found in diphtheria.

A DIPHTHERIA LYMPH.—The Government medical authorities at Washington have, after many experiments, announced the discovery of a lymph which gives immunity from diphtheria, and they hope to make it a certain cure for that disease.

HAIR DYES should always be avoided. All the various "hair restoratives" are both unwholesome and uncleanly. The loss of color of the hair depends upon constitutional causes, and it is rarely or never restored.

DIED OF TOO RAPID GROWTH.—A 15-year-old boy has just died in Brooklyn, N. Y., of too rapid growth. At the time of his death he was six feet two inches tall, but did not weigh 100 pounds.

USEFUL INFORMATION.

ELECTRIC MINE SIGNALING.—Whoever has been in a mine is familiar with the laborious method employed in giving signals to the men at the top of the shaft. It is a task that requires considerable muscle and endurance for the man at the 12th level to seize the lever and ring 12 bells, to indicate that the cage is wanted at that level. He will probably consume half a minute in giving the signal, and by the time this has been repeated at the surface to the engineer, it is a minute to a minute and a half before the engineer knows what is expected of him. This will all be changed at the Liding-tou. The mine will soon be supplied with electric signals, when a man at any level will only have to go to the shaft and throw a switch, and the small dynamo which will be used for that purpose will do the rest; for it will be a small dynamo and not batteries that will supply the current to operate these signals. Besides the saving in labor and time, it will obviate the possibility of mistakes, because a switch thrown at a certain level will unfailingly give the signal for that level, and the box containing the signaling apparatus being under lock and key, cannot be tampered with by those not in authority.—*English Paper.*

SUBSTITUTE FOR GUTTA-PERCHA.—A Portuguese gentleman, Senor da Costa, says *Invention*, is reported to have discovered an excellent and abundant substitute for gutta-percha, near Goa. It is the solidified fluid which issues from the Nivolo-antem, which grows wild in the Concan district, which is generally planted for hedges. It is insoluble in water, softens under heat, and hardens in the cold. It receives, moreover, and retains a given mold, can be cast into very thin sheets, and is capable of taking the minutest impressions upon its surface. Though white when it flows from the tree, in its dried state it is of a chocolate color, closely resembling gutta-percha. If this be true, the discovery is of enormous value.

LEATHER RAILWAY BRAKES.—A company has been formed in New South Wales for the purpose of exploiting the manufacture of railway brake shoes from compressed leather. Waste leather scraps are steeped in a solution and subjected to a hydraulic pressure to mold them to any desired shape. The leather shoe is said to possess distinct advantages over that of iron, with superior efficiency in every way. The leather shoe weighs 4½ pounds, against 21½ pounds for iron, and it will wear three times as long. More than this, it has a greater coefficient of friction, so that 40 pounds air pressure is as effective as 70 pounds with iron brake shoes.

QUESTIONABLE INVENTIONS.—It is said that Maine has produced a Keely with a mysterious motor. He lives in Monroe, and says that his machine is capable of one to ten horse-power, and does not derive it from steam, water, gas, or any agency now known. He is going to hitch the machine to churns and pumps. It is also said that Mr. Maxim, the inventor of the "Maxim gun," claims to have constructed an engine of 500-horse power, weighing only 1100 pounds, or 2.2 pounds per horse-power. Some of the large and most efficient engines have about 112 pounds dead weight per horse-power, including water.

ERASING LINES ON TRACING CLOTH.—If you wish to alter tracings, scrape out the lines with a sharp knife and rub smooth with a Faber Ink-eraser; then get a bottle of negative varnish, dilute it with alcohol so as to be quite thin; give the erased place a light coat of this varnish. When dry, you cannot detect the difference, either in the way the spot takes ink or in the way it prints. Another thing, the spot does not catch dirt as it does when not coated. The varnish may be bought of any dealer in photo supplies.

SPONTANEOUS COMBUSTION OF A TREE.—One of the sacred "tallow trees," standing at the entrance of the grounds which surround the imperial mansion of his majesty, the Emperor of China, spontaneously fired in some of its upper branches and burned to the ground on Dec. 15th. Scientists say that the tallow tree often fires of its own accord, but the superstitious Chinese take it to be an evil omen, and are greatly excited.

STEEL COLOR ON BRASS.—A steel color is developed on brass by using a boiling solution of arsenic chloride. A concentrated solution of sodium sulphate causes a blue coloration. Black, as on optical instruments, is obtained from a solution of platinum chloride, to which tin nitrate has been added. In Japan, brass is bronzed by using a boiling solution of copper sulphate, alum and verdigris.

WOOD CLOTH.—Cloth is now made of wood. Strips of fine-grained timber are crushed between rollers, the filaments carded in the usual manner with textile into parallel lines and spun into thread, from which the cloth is woven.

THE BLAST FURNACE.—It is estimated that the energies manifested by the action of a blast furnace over the limited space to which it is confined, are fully equal in proportion to that of the most active volcano.

A CONDOR was recently shot in Scott's valley, Santa Cruz county.

STEAM BOILER NOTES.

Red-Hot Furnace Experiments.

Some years ago much was said and written upon one of the clauses in the instructions given by Mr. L. E. Fletcher to firemen, with reference to shortness of water, where, in case of shortness of water being discovered, he advises the turning on of the feedwater. This is, no doubt, a very startling method of procedure to those who have not gone very fully into the matter, and at the time its advisability was very much questioned. To set the matter at rest, the Manchester Steam-Users' Association had a boiler constructed, in order to put the matter to a practical test under working conditions, and the chief engineer's report is now before us. Being a somewhat elaborate production, we are scarcely prepared to pronounce decidedly upon its purport, beyond stating that the experiments themselves were conducted under conditions closely approximating to those of every-day work.

The furnaces were hared of water by opening the blow-off cock and allowing the water to escape, while good, bright fires were burning, which could not fail to overheat the plates. When sufficiently heated to melt discs of lead, tin and zinc, the feed was suddenly turned on through special pipes, which injected the water directly on to the heated plates, but in no case, as is often assumed, was this followed by a sudden generation of steam at an excessive pressure, but in one case actually a reduction of pressure took place. Certainly there was one mishap, but this was clearly proved to be due to not turning on the feed soon enough. Some exceedingly practical information is given on several other subjects, especially as regards the bogging upward of the flue tubes, which was accurately ascertained by means of rods, and found to be as much as one-half inch in some cases.

There are also particulars of tests in which different types of boilers were put to work and the different temperatures taken above and below the furnaces were pointing out clearly the inadvisability of hurrying fire when raising steam. We think more details might have been given, and the work would have been acceptable at a much earlier date. However, we consider that steam-users are greatly indebted to Mr. Fletcher for the valuable information now given.—*The Mechanical World, London.*

MIXTURE OF STEAM AND HOT GASES.—A new method of working motor engines, with hot gases and steam, is the subject of recent English patents. According to the invention, the mixture of the steam with the hot gases to form a charge for doing duty in the working cylinder of the engine is effected in a chamber in the following way: First, the chamber having supplied a charge of mixture to the working cylinder and been thereafter open to an exhaust, hot gases are passed through to clean and dry it. Then, while the chamber is yet full of hot dry gases, it is closed. Then steam at a suitable pressure is admitted, mixing with the hot gases therein and forming the working mixture for use in the cylinder. This mixture, being at a high pressure, then expands in the cylinder, which, after the former has done duty in effecting a stroke of the piston, is opened to the exhaust and the spent mixture allowed to escape from it. For a single-acting engine, one mixing chamber suffices. A double-acting engine, however, requires at least two, in each of which the process takes place; but the chamber or chambers to supply actuating fluid to one end of the cylinder (or of each cylinder) must be separate from those that supply the other end, in order to allow ample time for the process of cleaning out, drying, filling with hot gases and admitting steam thereto to take place in an efficient manner, in each chamber, in the required order.

THE STEAM JACKET.—Prof. Thurston has recently made a compilation extending over 40 pages of figures and opinions as to the value of the steam jacket. He believes a discussion of the data thus collected will do much to reconcile the conflicting opinions as to the value of this device, which go to show that according to the circumstances the use of a jacket may be highly advantageous or actually deleterious. A summary of the results obtained by the various authorities shows that the gain by use of a jacket ranges from zero to over 30 per cent.

INCREASED USE OF COMPOUND LOCOMOTIVES.—According to a statement of Herr von Borries, Royal Inspector of Railroad Construction in Hanover, Germany, the number of compound locomotives in process of erection, and in use, increased, in the year from Nov. 1, 1889, to Nov. 1, 1890, from 580 to 1034, divided nearly as follows: Germany, 430; England, including those built for South America, India, etc., 523; Italy, 2; Russia, 32; Switzerland, 11; North America, 8; street locomotives, 28; total, 1034.

THE SAFETY-VALVE.—Be sure that your safety-valve is in working order; start it from the seat every day. Have a string attached to the end of the lever run through pulleys to a convenient place, so it will be handy to pull, and have climbing on top of the boiler occasionally. Take the valve apart and clean it. See that it works easily and does not bind.

SHOP NOTES.

The Man Not the Shop.

Many mechanics are striving to get forehanded enough to establish their own shops, hoping that in time they will grow into larger works, where they can execute heavy contracts. This is a laudable ambition, but it happens sometimes that men go into these enterprises with the expectation that the shop will grow of itself and that the public will seek them merely because they have shops. It should be borne in mind that nothing is to be had in this world without labor and pains, and that if a shop becomes known and has an established reputation, it is because some one is interested in pushing it. By whatever means it is secured, publicity must be had, for it is indisputable that people cannot give work to shops they do not know of. This point is one that escapes the attention of the average craftsman in any line, but particularly of engineers and machinists.

If men want new or old work to do in their shops, they must go where such work is to be had. Too many, however, wait for the work to come to them, and wait in vain usually, because some one in the same line, with more enterprise, has got ahead of them. It is queer, but it is true, that some mechanics will not hunt up work, because they cannot get rid of the feeling that they are asking favors of strangers. This is absurd. There are no favors in trade. If a man gets a contract it is because his terms are favorable to the buyer, and for no other reason. No manufacturer gives contracts for "love and affection," as wills are sometimes made.

It is not the small beginning which is in doubt, but the small beginner. Is he the man to succeed? This is the question. Has he the faith which will remove mountains, the courage, the courtesy, the business tact which will command success? If he has, it makes no difference how small the shop is on the start. A small shop with a large man in it will succeed, where a large shop with a small man in it will fail.—*Plumbers' Journal.*

CLEANLY AND ORDERLY WORKSHOPS.—There is no doubt about it, cleanliness about a shop is one of the rules which should be most rigidly enforced. There is no excuse for permitting piles of rubbish, scraps, etc., to lie around on the floor and benches, neither should the machinery be allowed to remain covered with grease and dirt. Clean machinery tends toward the keeping of everything in the best order. Dirt and grease often hide indications which if observed in time might prevent a breakdown and an attendant loss of property, and possibly a loss of life or an injury to the workmen. Workmen should take pride in keeping their benches and surroundings as free from litter as possible. It is an unpleasant sight to go into a shop and observe a workman, who desires some particular small tool, rummaging over the numerous scraps, tools, etc., which cover the machine or bench at which he is working, in order to find the tool he desires to use. Each workman should have a particular place for each tool, and return it to its proper place as soon as he is done with it. It is a very simple matter to clean up a bench at least once a day.

THE MAIN BUSINESS IN ALL SHOPS is shaping iron and steel—that is, getting it into shape so it will fit together, and also removing the surplus that does no good. The operations carried on may be divided into two classes—hot and cold treatment. You easily separate these in your mind. Hot processes are molding or casting when the metal is fluid and runs into shapes by gravity, and also include what I call plastic treatment, that of pressing, hammering, bending, and so on. This is forging. It comes under my department. Now these hot processes are not exact ones, because the material is hot and in an expanded condition, and allowance must be made for shrinking, as well as a surplus to cover finished dimensions. Cold processes are exact, because the material is treated at its normal temperature and remains as it is left. These processes consist mainly in trimming away the allowance the smith and the molder must make for shrinkage. This includes turning, planing, filing, drilling, scraping, and so on, and can be done by rule, in a degree, and can be done without much mental skill, if there are machines and manual skill.—*Industry.*

THE CARE OF MACHINERY.—Proper care of machinery is of vital importance in the economic running of a mill. While the quality of machinery varies greatly, operators differ still more in their management and care of machines. One operator will take a new machine and run it for five or six years without causing any perceptible depreciation in its value. Another man will take a similar machine and in two or three years he leaves it a total wreck. The machine being equal, the wreckage must lie in the operator. Every operator should perfectly understand the make-up of his machine and how to properly adjust all its parts. Running a machine does not consist simply in knowing how to run a hoard through it; yet the knowledge possessed by many operators does not extend much further than this. Learn your machine thoroughly, study it, acquaint yourself with the principles upon which it is constructed, and know how to adjust every part of it, not by rule, but by an intelligent understanding of the why and wherefore.



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W. B. EWER.

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SAN FRANCISCO:

Saturday, March 21, 1891.

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Passing Events.

The joint resolution previously adopted by the Senate has been adopted in the Assembly, requesting Congress to authorize the appointment of engineers to investigate the mines of this State, and to have the power to devise and execute plans by which mining in all its branches may be carried on without injury to agricultural lands or rivers of the State. Congress is asked to appropriate \$1,000,000 to this end.

The will of the late Senator Hearst leaves all his mines and mining property to his widow. Mrs. Hearst thus becomes the largest mine-owner of any lady in the United States.

Charles N. Felton has been elected U. S. Senator to fill the unexpired term of the late Senator Hearst.

The new land law, published elsewhere in the PRESS, merits the close attention of all interested in the public lands. The measure is one which makes radical changes in the previously existing system.

The City Council of Butte, Montana, some time since passed an ordinance declaring the smoke fumes from the roasting ore heaps and smelters proper a nuisance and a decided menace to public health, yet in that ordinance it was distinctly stated that the smelting companies were to have nine months in which to adopt contrivances for either destroying or carrying off the fumes. So far only three months of this time has elapsed, but the Health officer has issued warrants for the arrest of offenders.

No More Gold Bars for Shipment.

On Tuesday of this week the superintendent of the U. S. Assay office in New York received notice from the director of the Mint that \$1,000,000 in gold bars ordered by two firms would not be allowed to be taken for export. This is the first time in eight years that the Government has refused to allow gold bars to be taken out for export.

The privilege of converting gold coin into bars has hitherto been accorded without hesitation, but it was found that speculators took advantage of the same to await a rise in foreign exchange and thus be prepared to make money out of the advance. The Treasury officials have long felt that the exercise of the privilege tended to take gold out of the country, and for this reason, as well as to prevent unnecessary speculation in the commodity, the application, in accordance with a decision reached some days ago, was refused.

The refusal was based upon the new law enacted a few days before the close of the last session of Congress, whereby the Secretary of the Treasury is authorized to convert gold coin into gold bars upon application, charging therefor at the rate of four cents for each \$100, or he is authorized, in his discretion, to refuse outright to convert the coin into bars. This refusal does not prevent the melting of the coin into bars by private parties, but they cannot do it as cheaply as the Government, the average cost outside of the Government mints being 12 cents for \$100.

Exporters of gold prefer to send it in bars, if possible, for the reason that the loss from abrasion and other causes is greater in the case of gold than in gold bars. It is therefore believed that the new departure will tend to check the exportations of gold from the country.

Acting Secretary of the Treasury Nettleton, referring to the refusal to allow gold bars to be exported, said the action was taken with the full approval of the President, under authority of the recent Act of Congress giving the Secretary of the Treasury discretionary power to refuse such exchanges when deemed necessary for the interests of the Government. On the last exchange a charge of four cents per \$100 was imposed, but as this rate does not seem to deter the shipment of Government gold, the Treasury Department decided to discontinue the exchange altogether for the present.

The New Land Law.

Elsewhere in this number of the PRESS we give the full text of the new land law passed by the late Congress, and which makes very marked changes in our public land system. The new Act is the most sweeping that has ever been passed since the enactment of the original homestead law. The timber-culture and pre-emption laws are repealed, with provisions for the protection of vested rights. The desert-land law is amended to compel the expenditure of at least \$3 per acre in irrigation works and the amount that can be taken up is limited to 320 acres. The homestead law is subjected to important modifications. All lands, with immaterial exceptions, are withdrawn from public sale. Provision is made for the acquisition of title to lands in Alaska for manufacturing and commercial purposes and for townsites. The President is given authority to withdraw timber land from entry at any time and to any extent. Irrigation is encouraged by the provision with relation to reservoir sites.

The only reference to mineral lands in the new law is the section which states "that townsite entries may be made by incorporated towns and cities on the mineral lands of the United States, but no title shall be acquired by any such towns or cities to any vein of gold, silver, cinnabar, copper or lead, or to any valid mining claim or possession held under existing law. When mineral veins are possessed within the limits of an incorporated town or city, and such possession is recognized by local authority or by the laws of the United States, the title of town lots shall be subject to such recognized possession and the necessary use thereof, and when entry has been made or patent issued for such townsites to such incorporated town or city, the possessor of such mineral vein may enter and receive patent for such mineral vein and the surface ground appertaining thereto. *Provided*, that no entry shall be

made by such mineral-vein claimant for surface ground where the owner or occupier of the surface ground shall have had possession of the same before the inception of the title of the mineral-vein applicant."

Hydraulic Mining.

We have in a previous number of the PRESS given the Voorhies joint resolution on the mining industry which was adopted by the Senate some weeks since and has finally been adopted by the Assembly. It will without doubt be signed by the Governor, as it contains among other things his remarks on the subject of hydraulic mining given in his inaugural address. In truth, it was due to the fact that the Governor's inaugural address brought this subject up forcibly that the joint resolution was introduced and adopted. He urged the Legislature to take the initiative in obtaining the assistance of the Federal Government.

The main resolutions in the document are as follows:

Resolved, By the Senate of California, the Assembly concurring, that we earnestly but most respectfully request Congress to pass a law authorizing the Secretary of War to appoint a competent Board of Engineers, to consist of three or five members, as may be deemed best, whose duty it shall be to investigate the mines or mining districts of this State; said Commission to have the further power of devising and executing plans whereby mining, in all its branches, may be carried on without injury to agricultural lands and the navigable streams of the State. And to the accomplishment of this end we ask Congress to appropriate one million dollars, believing, as we do, that the Government will be repaid many fold for such action.

Resolved, That a copy of this preamble and resolution be forwarded to our Senators and Representatives in Congress by the Governor, under the seal of the State.

Coming officially from the Legislature of the State of California, this request will be more apt to succeed than if as a mere petition. Congress must pay some attention to the matter under the circumstances, and take steps to grant the relief asked for. Thousands of people have been made poor by the closing of the mines, and the Government should take active measures to find out some possible way by which the property of these men can be restored to usefulness without detriment to others.

NATURAL GAS IN ENGLAND.—Quite a little excitement was recently created in the neighborhood of south Durham, Salt district, England, by the discovery of natural gas. On the 7th of February, while parties were engaged in sinking a drill-hole for salt, there was a sudden outburst of water and gas, thrown high into the air. The gas was soon in a blaze from a small fire near the well-hole, and burned with great fury for some 24 hours, when it gradually ceased. It is thought that a permanent supply of gas might be obtained by sinking a little deeper. At the time of the outburst they were down about 900 feet. At last accounts there was some dispute about the nature of the gas, some insisting that it was not the true [natural gas] as was found in such abundance in this country. Should it eventually prove to be the same, a great fortune is predicted for the future of that locality, as well as the north of England generally.

ROBERT M. FRYER will be remembered as a man who got the whole mining community excited about the "Fryer process" some years ago, and who built works at Grass Valley, which were a failure. He is now about to have built an ocean steamer, 206 feet long and only 16 feet wide at the point of greatest beam, with which he hopes to attain a speed of 35 miles an hour without any special effort. To keep this knife-blade from capsizing, she will carry a keel weighing 68,000 pounds. This is simply applying the principle of the English type of sailing yacht to a steam vessel. The new steamer is to be built at Baltimore.

MEXICAN ORE IMPORTS.—The Nogales Herald prints a statement of the amount of ore sent through the Nogales custom house during the month of February, which shows a heavy increase over any previous month in the history of the town. These are the figures: Silver ore, 1,441,225 pounds, valued at \$123,601; lead ore, 165,528 pounds, valued at \$5491; copper ore, 21,066 pounds, valued at \$1056. The bullion importations were: Gold, \$33,600; silver, \$124,758. The amount of duties collected on the ore was \$2555.84.

Mining Bureau Museum.

Following are among the recent contributions to the museum of the California State Mining Bureau:

Garnet—Almandite in mica schist, with khaetzite, Santa Margarita Ranch, San Diego; from H. W. Fairbanks.

Mica, Department Baja, Vera Paz, Guatemala; David B. Rea.

Manganese ore—Pyrolusite, Corral Hollow, Alameda Co.; Ad. Sommers.

Silver ore with chrysocolla and crystallized gypsum, Candelaria, Esmeralda Co., Nev.; J. L. Callison.

Calcite—massive, East Oakland, Alameda Co.; R. C. Look.

Chrysolite, Richmond Co., Quebec, Canada; Benj. E. Lyster.

Michigan currency, value \$3, issued in 1838 and popularly called "Red Dog" or "Wild Cat" money; A. S. Penfield.

Pearls from fresh-water mussels, Sugar Creek, Wisconsin; Mrs. J. H. Martin.

Siderite (carbonate of iron), with hematite on quartz, Antwerp, N. Y.; Williamsburg Scientific Society.

Indian flint arrow head, Blannerhasset Island, West Virginia; Jas. Goucher.

Hauzerite (sulphide of manganese). Very large and fine crystals, Ragusa, Sicily.

Lignite, 25 miles northeasterly from Redding, Shasta Co., vein 21 feet thick; Oscar C. Schulze.

Quartz (Saccharine), 12 miles north of Willits, Mendocino Co.; E. R. Shimmie.

Sandstone, crushing strength 8000 lbs. to the square inch, Ventura Co., Ventura Brownstone Co.

Gold quartz with chalcophyllite, 60 miles above Juneau, on the coast of Alaska; G. W. Yount.

Borax (borate of sodium), Saline Valley, Inyo Co.; A. Neuschwander.

Bernardinite (a hydrocarbon), San Bernardino Co.; Geo. D. Craig.

Cyanite (silicate of aluminum), in mica schist, near Los Angeles; C. N. Pring.

Cobalt ore, erythrite and smaltite on calcite, San Gabriel canyon, Los Angeles Co.; W. H. Adams Jr.

Beryl and columbite, Portland, Conn.; E. F. Sheldon.

Granite, anorthite, New Glasgow, Quebec, Canada; H. Sampard; also specimens of trap, calcite, syenite, dolomite, feldspar and trachyte, contributed by the same.

Calcite in layers interstratified with chlorite, Ravenna, Los Angeles Co.; J. Robertson.

Chrysolite (silicate, etc.),—Knight's Ferry, Stanislaus Co.; W. A. Threlfall.

Gypsum (black color, due to oxide of iron).—Ventura Co.; A. J. Maus.

Spinel.—Bergen Hill, N. J.; Miss S. P. Monks, who contributes also numerous other mineral specimens from various localities.

Opal.—Variety opal agate, La Silletta, Jalisco, Mexico; Williamsburg Scientific Society.

Pyrite.—Iridescent on calcite, Wooden mine, Egremont, Cumberland, Eng. Marcasite (sulph. iron), Dover Cliffs, Eng.; Williamsburg Scientific Society.

Erythrite (hydrous arsenate of cobalt).—Cobalt bloom, San Gabriel canyon, Los Angeles Co.; W. H. Adams.

Silver.—Native in smaltite, arsenide of cobalt and nickel; W. H. Adams.

Silver Ore.—Silverado mine, Napa Co.; Dan Patton.

Elk Horn.—H. Davis, Oakland.

Graphite on Quartz.—Santa Rosa, Sonoma Co.; J. M. Walker.

Fossil tooth, Centennial claim, Klamath river, Siskiyou Co.; numerous fossils of various kinds, consisting of the jaws, teeth, tusks and other bones of mammoths and other gigantic animals, together with Indian relics, specimens of ore, etc., found on San Miguel, San Nicolas and Santa Rosa islands, off the coast of Southern California; Japanese arrow-heads of the kind formerly used in warfare; A. Hattori.

Old style Chinese matchlock, with ammunition and accoutrements, captured from the Chinese by the French in 1882—a curious implement; Geo. A. Montell.

U. S. half dollar of 1836; C. W. Ormsby, Oakland.

Sapphire (corundum), 4 specimens, Cashmere, India; Chas. Batchelor.

Boiler Explosions.—During the year ended June, 1890, only 21 lives were lost through boiler explosions in England. This is below the average for the last seven years, and, considering the great increase which must have taken place during that time in the total number of boilers working in that country, the tendency appears to be toward increased safety; at any rate, there are no facts which warrant the assumption of increased negligence on the part of steam-users.

ENGINE FOUNDATIONS.—An indicator card lately taken from a Westinghouse engine showed oscillations on all the lines, such as appear in the expansion line at higher speeds. The trouble was found to be in the spring of the foundation upon which the engine was set giving an oscillatory movement to the engine and which affected the indicator as well. This experience shows the necessity of solid foundations for engines.

FOR February, quicksilver shipments from Calistoga, Napa Co., were 722 flasks. Of this, the Napa Co. mine produced 310 flasks, the Great Western, 155, Bradford, 132, and the Sulphur Bank, 125.

The famous Breyfogle mine in Death Valley has again been discovered—for about the fiftieth time.

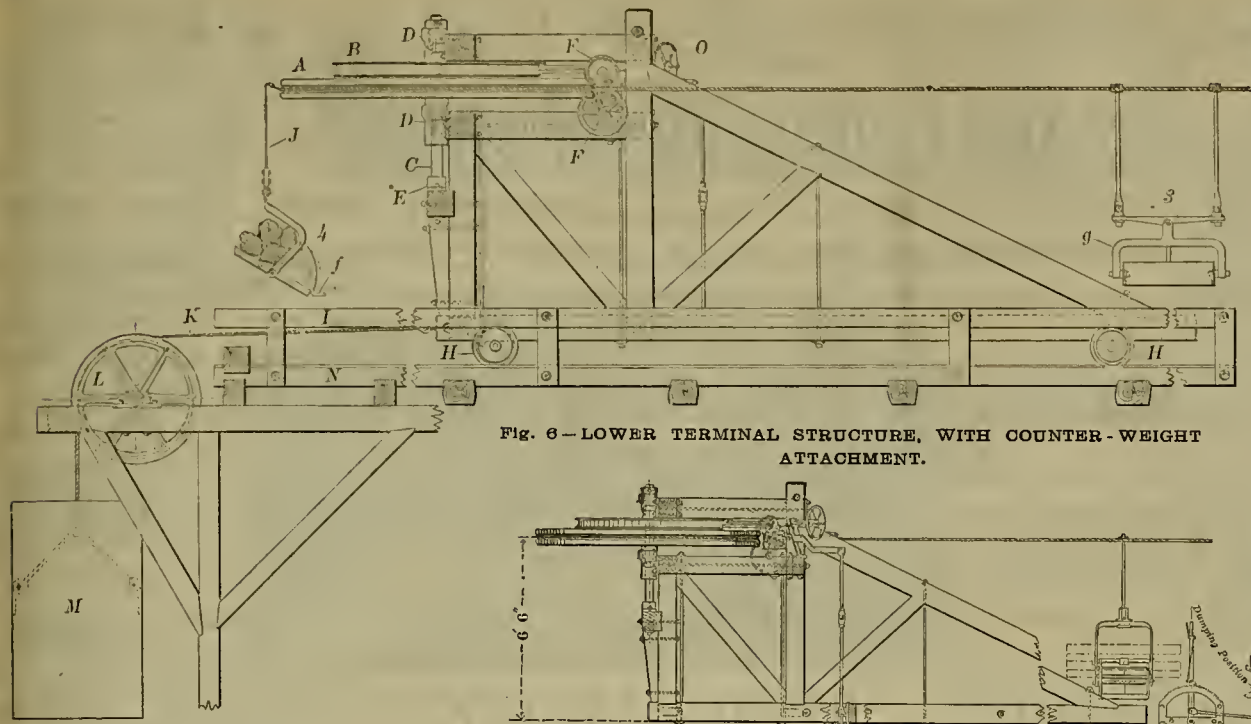


Fig. 6 - LOWER TERMINAL STRUCTURE, WITH COUNTER-WEIGHT ATTACHMENT.

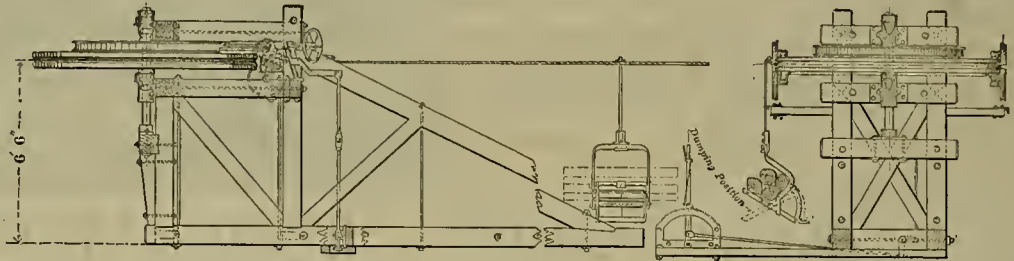


Fig. 8 - ELEVATIONS AND PLAN OF UPPER TERMINAL.

The "Vulcan" Wire Ropeway.
(Concluded from page 177.)
mounted on steel splindles which are fastened on the hubs of the stands. The stands are made of cast iron and are fastened to the top of the cross-arms, the front end having lugs which span the width of the cross-arm timber. At the back end of the stand is an ohlong hole which permits of adjusting the sheave.
The guide-sheaves and stands (Fig. 3) are used at the terminals to guide the rope fair into the terminal sheaves and are used for station sheaves where the rope has a tendency to rise from its seat on the supporting sheave.
The clips are the most important attachments

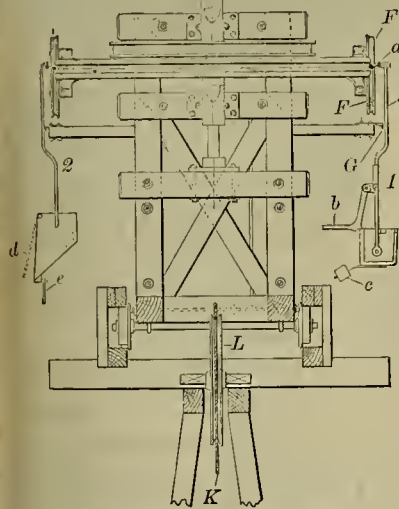
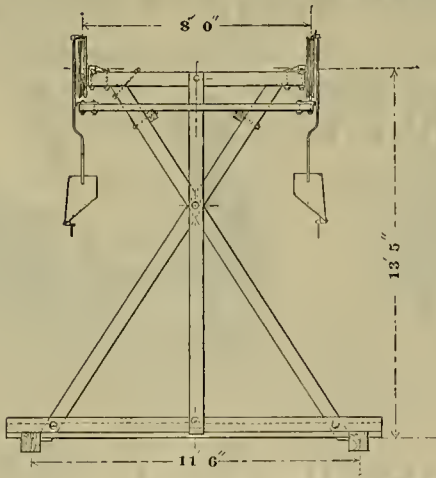


Fig. 7 - END OF LOWER TERMINAL.



Figs. 10 and 11 - SUPPORTING STRUCTURES.

of a ropeway system, as on them depends the successful and economical running of the ropeway. The Vulcan patent inserted ropeway clip (Fig. 4) is made in two parts, B and C, which are connected with a pin, H, thus forming a hinge that opens upward. On the extreme end of the body, B (Fig. 4), is the spiral web A, which enters the rope. On the other end are two lugs, 8 and 9, drilled to receive the pin H (Fig. 5). The part C has on one end a round shaft; on the other end is the lip I that seats on the body B.
The spiral web A has corrugations 1, 2, 3, 4, 5 and 6. This spiral is made to conform to the pitch of the strands of the rope and to the size of its strands, so that the rope fits accurately in the corrugation. Fig. 5 represents the rope as it appears when the clip is inserted. Between the collars D and E goes the hanger which carries the load. The action of the clip on coming to a sheave is as follows: The body B comes in contact with the rim of the sheave, and is raised up as it travels over it. As it passes to the other side, it falls gradually until the lip I comes in contact with the body of the clip B. During all this operation the shaft C

of the clip remains in a horizontal position. The object of having the clip hinged is to provide an attachment for ropeways that will permit the use of deep and wide-grooved sheaves. Fig. 6 represents a side elevation of the lower terminal, the end to which the counterweight is attached. Fig. 7 is an end elevation of the same. The main frame on which is mounted the machinery is well framed and bolted and is furnished with a heavy set of car-wheels, H H (Fig. 6), which run on a flat iron track. At the extreme end of this track, which is long enough to take up the stretch of the rope, is placed the sheave L. The counterweight rope, K, passes over this sheave, one end being attached to the terminal structure, the other end to the weight receptacle, M. To a cross-arm, which is bolted to the main frame, back of the grip-sheave, is mounted a cast-iron frame that carries the guide-sheaves F and F. The terminal structure is encircled by a guide rail (Fig. 7), bolted to projecting arms. This is to prevent the conveyors snarling when turning around the terminals. To prevent accident, such as the terminal rising or running off the track, the top rail I (Fig. 6) is used. This is

set so that the car-wheels, H H, can run freely under it. At the point at which the material transported is to be discharged a permanent slip is placed, which releases the catches that hold the conveyor doors closed.
Fig. 8 shows the upper or loading end of the ropeway system on side and end elevation and plan. The construction of frame and mounting of the machinery is the same as on the lower terminal. On this terminal the track and counterweight are dispensed with, the frame being anchored to a good foundation made of masonry or of heavy logs of sufficient weight and stability to resist the strain put upon the rope. The ropeway is generally operated from this end. The brake to regulate

the speed at which it is desired the rope should travel is moved by the lever attached to the quadrant (elevation Fig. 8), and is operated from a platform which is bolted to the bottom of the main frame. This brake is only used when the line is a gravity one. When power has to be applied to run the rope, the brake-wheel is dispensed with, and in its place is put a bevel gear, driven by a pinion, to which power of any suitable character is applied. As the system is loaded at upper terminal, the brake attendant is always at this end.
Fig. 9 is an enlarged front elevation of the upper work or station structures. It is very substantial, being turned in every direction. When once set up it cannot get out of shape.
The supporting structures shown in Figs. 10 and 11 consist of wooden framework averaging about 15 feet in height. Their construction is easily seen by the cuts.
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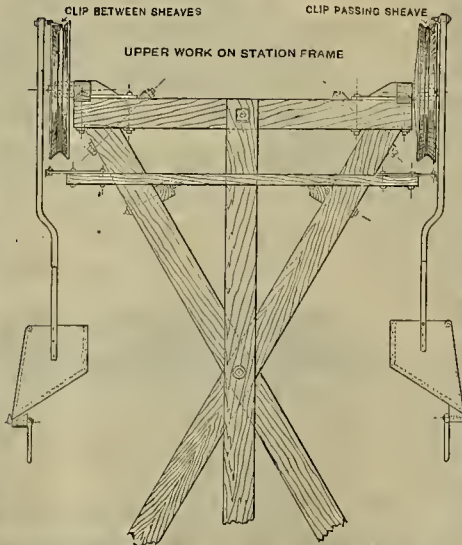


Fig. 9 - UPPER WORK ON STATION STRUCTURE.

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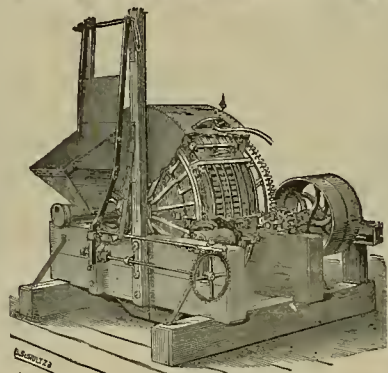
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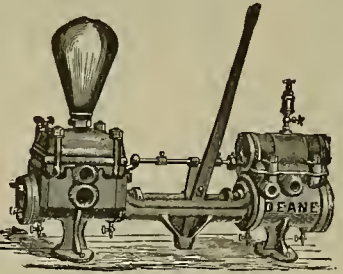
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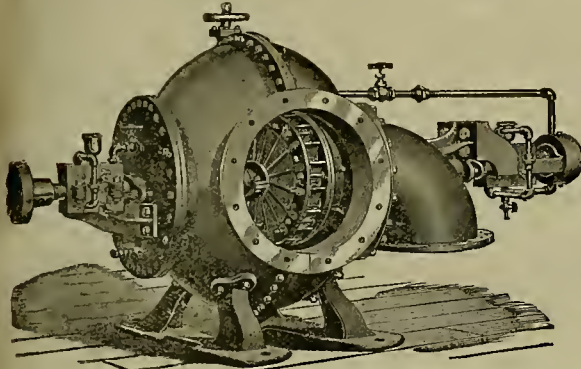
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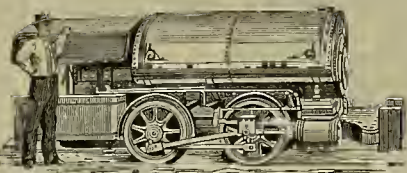
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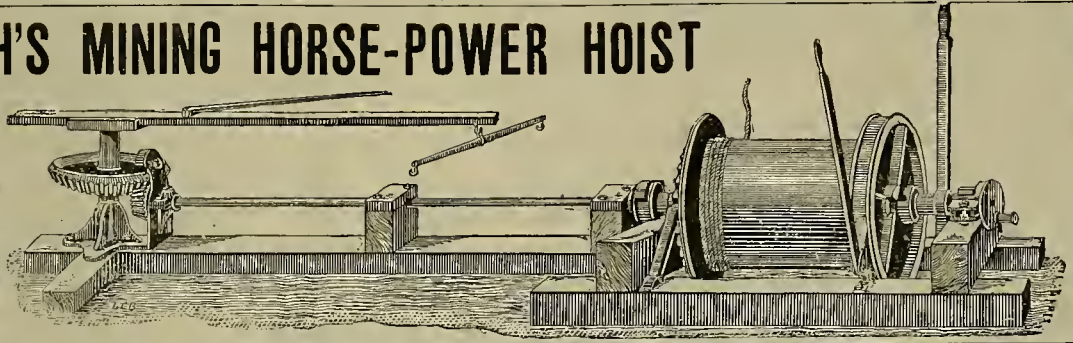
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Mining Share Market.

Continued activity in Comstock mining shares marked the past week, with Best and Belcher making the best up move, although all other shares sold at higher prices. The advance in Best and Belcher is largely due to Con. Virginia arranging to take out the rich ore lying toward the former mine, which is likely to show up well in Best and Belcher. Besides this, the latter mine is doing some important work of its own, that, unless stopped, will develop rich ore to the west. An assessment by Hale and Norcross dampened the middle group mines shares. A reported pending assessment by Yellow Jacket, Con. Imperial and Bullion causes shares in the Gold Hill mines to move slowly. Confidence shares made quite an up move, but fell back as fast as they went up. There can be no doubt of the public lacking faith in the stability of the market, for all reports are confirmatory of there being more sellers than buyers, but some day this will be reversed—how soon, the writer cannot say. Everything at present warrants the belief that higher prices will obtain, for the manipulators appear to be (whether really so or not we are unable to learn) trying to get the public interested so as to unload to collect assessments while taking out bullion for themselves. The Alta group shares scored a slight advance the past week, with Justice the leader. In outside shares trading continues light, although the Bodies and Tuscaroras moved up slightly.

From the Comstock mines our advices report that on the 1100-foot level in Con. Virginia they cut 18 feet of ore going from \$60 to \$80 a ton. In Best and Belcher they are making good progress running for the ore lying to the west. News from the other North-End mines is of an encouraging character, and promises to be of an exciting nature before the close of the spring months. Between the Hale and Norcross and Savage mines important connections have been made, and now we can reasonably look for ore strikes, particularly since the former mine has levied another 50-cent assessment. On second thought, we are led to think that the managers of these two mines do not wish to make an ore development, but the work under way in Chollar lying south of Hale and Norcross, and in Gould and Curry lying north of Savage, may lead to rich strikes of ore next to or on the line of the mines, which would have the same effect as if they were made in Savage and Hale and Norcross. In Belcher they are cleaning out the old drifts drained by the pumps, with good results looked for when active prospecting work is inaugurated. In Overman the rich finds heretofore reported are confirmed by late advices received from Virginia City. In the other Gold Hill mines important work is under way. From the Bodies our advices report that eight stamps are dropping on Bodie ore, but official letters received yesterday do not mention the fact. Perhaps the bullion from the ore milled will be credited to another mine. The battery assays of Bulwer ore are higher, now going over \$40 a ton. From the Tuscaroras our advices are about as heretofore reported, as they are also from the Quijotas.

The mining share market opened this (Thursday) morning fairly active, at irregular prices. After regular Call, prices advanced slightly, but toward noon hour they were selling at about Call Board prices.

Confirmed advices from Virginia City report that more stamps will soon be dropping on Comstock. This is welcome news provided the bullion is not distributed among a favored few. Savage battery assays continue to creep up by small degrees. Con. Virginia's battery assays last week were slightly lower.

ON A RAILROAD STRUCTURE.

The Pennsylvania Railroad Co. is erecting at Jersey City an elevated railroad structure, over one mile long and four tracks wide, on which their entire passenger travel of millions of people will enter and leave the city. The iron work, which has 13 feet steel clearance, is immense in its proportions, and was made and erected by the Pencoyd Iron Works. It is a marvel of accurate and substantial construction. It has been the practice of the P. R. R. Co. heretofore to use a light colored paint on all of their iron structures, but after a thorough examination into the merits of Dixon's Silica-Graphite Paint they chose that as the paint for this work.

The work of painting is rapidly progressing, and Mr. Eckert, the superintendent of painting, says that, while he was at first very much opposed to the use of Graphite Paint, he now finds it is easily laid on, with a covering power twice that of white lead and three times that of other mineral paints, and of very handsome color.

The case with which this Graphite Paint is applied has been a subject of frequent comment among painters. Graphite in itself is an unequalled lubricant and when its lubricating quality is added to that of the oil it is not surprising that the painter can apply it with ease and comfort and wonder why he is not tired.

J. G. Allen, 304 Market street, San Francisco, is the Pacific Coast Agent.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

DIAMOND DRILLS

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New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

INTERNATIONAL TRANSIT LINE (Oakland), March 13. Object, to transport vegetables, fruit, grain, and merchandise of all descriptions to all parts of the United States and throughout the civilized world. The company will also own its own rolling-stock and deal in real estate for its own warehouses, negotiate loans, etc. Capital, \$1,000,000. Directors—W. P. Jones, V. D. Moody, H. Sevensing, J. M. Bailey and J. R. Lanktree.

ACME BUILDING AND LOAN ASS'N., March 14. Capital stock, \$100,000. Directors—S. J. Aschheim, Chas. J. Simon, A. P. Otto, S. B. Schloss, Jacob Heyman, David Davis and R. P. Hurlburt.

AMERICAN FUEL-SAVING CO., March 16. Capital stock, \$1,000,000. Directors—Peter Abramson, W. W. Montague, A. M. Loryea, Julius Jacobs and E. M. Reading.

CALIFORNIA FRUIT EXPRESS CO., March 17. Capital stock, \$1,000,000. Directors—J. S. Whitcomb, E. E. Avery, W. M. Ott, C. H. Brookman and P. S. Deincer.

PIONEER PAPER MILL CO., March 17. Capital stock, \$500,000. Directors—Sarah J. Taylor, Edwin M. Taylor, Samuel J. Taylor, W. P. Taylor, and James I. Taylor.

TUOLUMNE RIVER QUARTZ M. CO., March 18. Capital stock, \$120,000. Directors—A. B. Cruikshank, Jabez Howes, John A. Magee Jr., John Frace and J. W. Burling.

VENTURA CRYSTAL PLASTER CO., March 18. Capital stock, \$350,000. Directors—W. E. Sharp, W. E. Atwater, H. B. Sharp, A. H. Hall and G. H. Wheeler.

JUSTICE BUILDING AND LOAN ASS'N., March 18. Capital stock, \$3,000,000. Directors—Simon Solomon, Chas. C. McDonald, Frank A. Lux, Wm. Osterman, B. J. Sideman, G. Conn, Chas. J. Simon, R. Goldfish and Jules Marzbach.

BACK FILES OF THE MINING AND SCIENTIFIC PRESS (unbound) can be had for \$3 per volume of six months. Per year (two volumes) \$6. Inserted in Dewey's patent binder, 50 cents additional per volume.

Assessment Notices.

CRESCENT MILL & MINING COMPANY. Location of principal place of business, San Francisco, California. Location of works, Crescent Mill, Plumas County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on Friday, the 20th day of February, 1891, an assessment (No. 5) of Twenty-five cents (25c) per share was levied upon the Capital Stock of the Corporation, payable immediately in United States gold coin to the Secretary, at the office of the Company, No. 310 Pine Street, Room 40, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of April, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 4th day of May, 1891, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
J. H. ISHAM, Secretary,
Office, No. 310 Pine Street, Room 40, San Francisco, California.

DELINQUENT SALE NOTICE.

GRAY EAGLE MINING COMPANY—Location of principal place of business, San Francisco, California. Location of works, Placer county, California.

Notice—There are delinquent upon the following described stock, on account of Assessment (No. 2) levied on the 4th day of February, 1891, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
Barrows, A. W., Trustee.....	556	271	\$ 8 13
Francis, H. L., Trustee.....	444	1,600	45 02
Horton, T. R., Trustee.....	665	2,500	75 00
Lane, Mr. Sarah, Trustee.....	365	200	6 00
Stout, C. N., Trustee.....	477	953	28 50
Scarlee, W. A., Trustee.....	618	1,000	30 00

And in accordance with law, and an order of the Board of Directors, made on the 4th day of February, 1891, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, Room 11, No. 308 California street, San Francisco, California, on MONDAY, the 30th day of March, 1891, at the hour of one (1) o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of the sale.

A. W. BARROWS, Secretary pro tem.
Office, Room 11, No. 308 California street, San Francisco, California.

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E. P. HEALD, President.
O. S. HALEY, Secretary.

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COAL MINES OF THE WESTERN COAST.

A few copies of this work, the only one ever published treating of Pacific Coast Coal Mining, have been obtained, and are for sale at this office for \$2.50 per copy. It was written by W. A. Goodyear, Mining and Civil Engineer, formerly of the California State Geological Survey.

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The Patent Law provides that in case a patent, which is the evidence of the contract, is not executed in compliance with the requirements of the law, it may be annulled and rendered void. Hence it is of the greatest importance to every inventor that his patent or contract be skillfully and accurately drafted, in order that it may afford him complete protection for his invention during the life of his patent.

How to Procure a Patent.

To avoid all needless delay, however, and secure patents at the earliest moment practicable, inventors will do well to forward a model, drawing or sketch, with a plain, full and comprehensive description of their invention (stating distinctly what the particular points of improvement are), with \$15 as a first installment of fees. If the improvement appears to us to be novel and patentable, the necessary papers for an application for a patent will be prepared immediately and forwarded to the inventor for his signature. When he receives the application and finds it duly prepared, he will carefully sign and return the same plainly addressed to us, with postal money order or express receipt for our own fee. The case will then be promptly filed by us in the Patent Office, and vigorously prosecuted to secure the best patent possible. [This course is the most expeditious and satisfactory, as no time is lost in transmitting correspondence relative to the preliminary steps.] When the patent is allowed, the inventor will be duly notified, and on sending the final Government fee of \$20 to us, we will order the issue of the patent, and forward the same as soon as it is secured from the Patent Office.

The payments are thus divided and made easy. We make no pretense of doing cheap work, in order to entice custom, nor do we afterward make additional charges to bring the bill up to a fair compensation. We do our work honestly and thoroughly, and we never give up a case so long as there is a chance of obtaining a patent. The Agency charge, including drawings, rarely exceeds \$40, and for this we do all we can without appealing the case.

Models and Drawings.

Models are now seldom required by the Commissioner of Patents, and generally only in intricate cases. Perfect drawings of practical working machines are more satisfactory to the Patent Office than the old cumbersome system of storing up an immense bulk of countless models.

Drawings or sketches, sufficient to illustrate the invention clearly, with a description that will enable us to make a full set of perfect drawings for the Patent Office, is all that we require. A model will answer our purpose as well, however, in cases where the inventor can more easily furnish it.

Secure a Good Patent.

The value and even the validity of a patent often depends on the character, clearness and sufficiency of its drawings. There are thousands of existing patents in which the improvements are but partially or poorly illustrated in the drawings. When an attempt is made to dispose of such patents, the vagueness and defects of the drawings often prejudice capitalists and manufacturers against the invention, while in reality it may be of great value, and would meet with ready sale had it been skillfully, completely and artistically portrayed. In all cases prepared by us, the drawings are made under our personal supervision, by skilled draftsmen in our constant employ, and every precaution is taken to have the invention fully and clearly shown by different views, so that the improvement will be readily understood by the Examiners in the Patent Office, and comprehended by the public when the patent is granted.

Advantages to Inventors on the Pacific Coast.

The firm of DEWEY & CO. has edited and published the MINING AND SCIENTIFIC PRESS continuously since 1850—a period of 39 years. Few agents, who are still engaged in the business, have had so long-extended practice in patent soliciting. The members of the firm give personal attention to the applications entrusted to their care; and their familiarity with inventions and with local affairs in the Pacific States and Territories enables them to understand the wants of inventors on this coast more readily and thoroughly as we believe, than any other agents in America. Thus there is saved a great deal of the time which ordinarily, when distant agents are employed, is wasted in preliminary writing back and forth.

This happy combination of long business experience together and wide connections has placed our firm in a position unquestionably most fortunate for affording inventors prompt and reliable advice, and the best facilities for securing their full patent rights with safety and dispatch at uniformly reasonable rates.

Every patentee of a worthy invention is guaranteed the gratuitous publication of a clearly stated and correct description of his invention, in one or more of our influential and reliable newspapers, affording just the circulation best calculated to widely inform the class of readers especially interested in the subject of his invention.

Caveats.

A Caveat is a confidential communication made to the Patent Office, and is therefore filed within its secret archives. The privilege secured under a caveat is that it entitles the caveator to receive notice, for a period of one year, of any application for a patent subsequently filed, which is adjudged to be novel and is likely to interfere with the invention described in the caveat, and the caveator is then required to complete his application for a patent within three months from the date of said notice. Caveat papers should be very carefully prepared. Our fee for the service varies from \$10 to \$20. The Government fee is \$10 additional.

To enable us to prepare caveat papers, we require only a sketch and description of the invention.

Rejected Applications.

Inventors who have rejected cases (prepared either by themselves or for them by other agents) and desire to ascertain their prospects of success by further efforts, are invited to avail themselves of our unrivaled facilities for securing favorable results. We have been successful in securing Letters Patent in many previously abandoned cases. Our terms are always reasonable.

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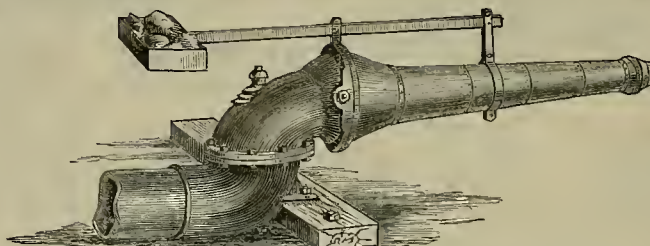
FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

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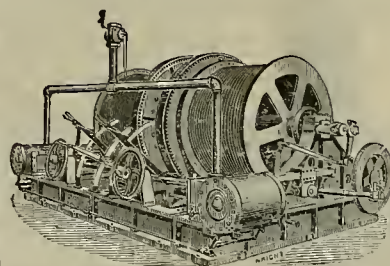
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Experimental machinery and all kinds of models, Tin and brasswork. All communications strictly confidential.

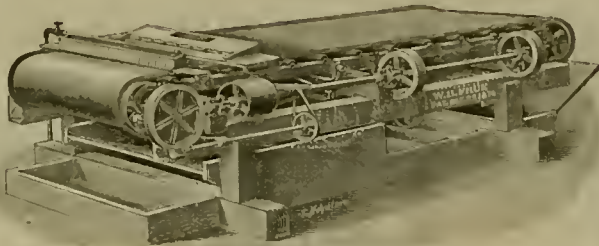
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The Best Ore Concentrator in the market, having double the Capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, crushing 350 tons per day, and is giving entire satisfaction as against 48 plain Belt Machines, taking the Pulp from the other 120 Stamps.

Price of Improved Belt Frue Vanner, \$825, f. o. b.
Price of Plain Belt Frue Vanner, \$575, f. o. b.

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ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., Room 15, No. 132 Market Street, San Francisco, Cal.



Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), London, October 8, 1885.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

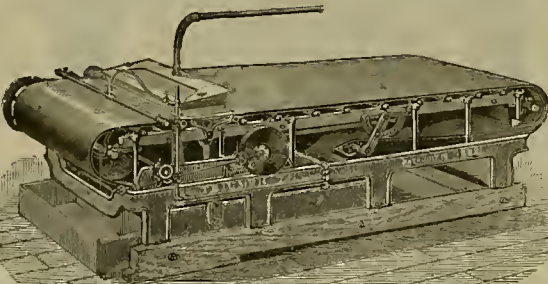
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt - - - - - \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin it need be. Circulars and testimonial letters furnished on application.



JOSHUA HENDY MACHINE WORKS,

39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)
Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

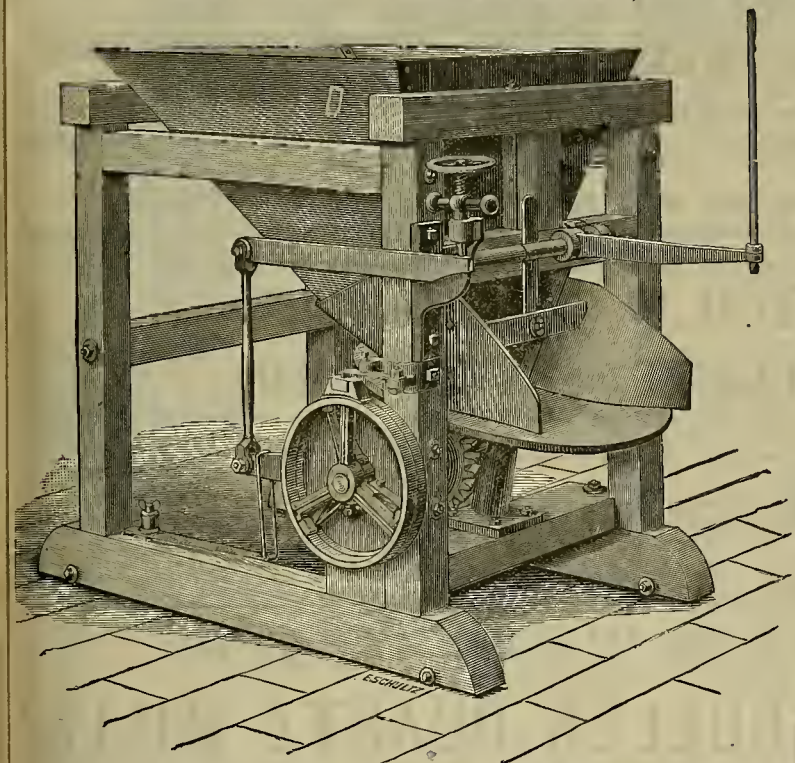
Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansone, S. F.
Location of Works, Grass Valley, Nevada Co., Cal. }
GRASS VALLEY, NEVADA Co., CAL., Nov. 10, 1885.

Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:
GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that in form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices. DAVID McKAY, JR.,
[Signed] Sup't North Star and Original Empire Mining Co.
N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

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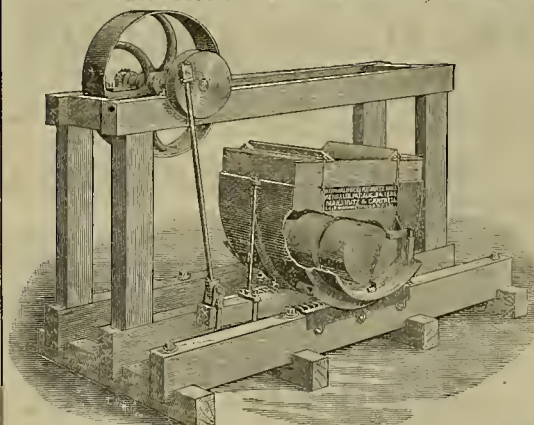
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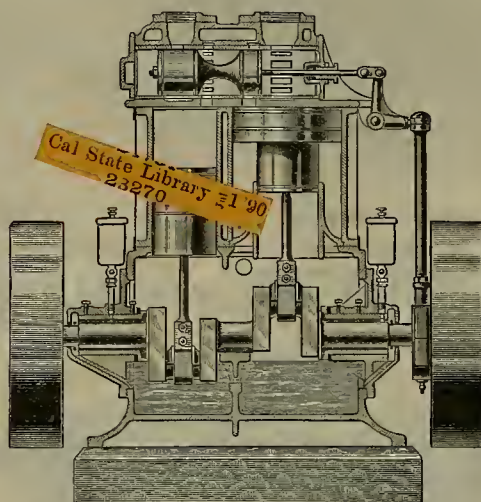
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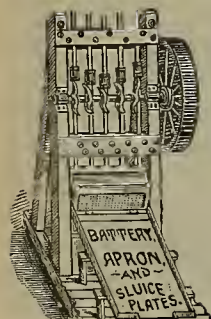
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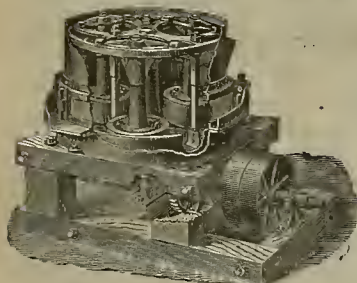
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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXII.—Number 13.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, MARCH 28, 1891.

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The Dodge Sampling Machine.

The sampling machine illustrated on this page, will save a vast amount of labor and floor space, and will sample ores much more

correctly than can be done by hand. For large sample works a No. 2 machine is used for coarse material and a No. 3 for resampling the products of No. 2. The No. 3 machine can be set to crush very fine, and is very valuable to

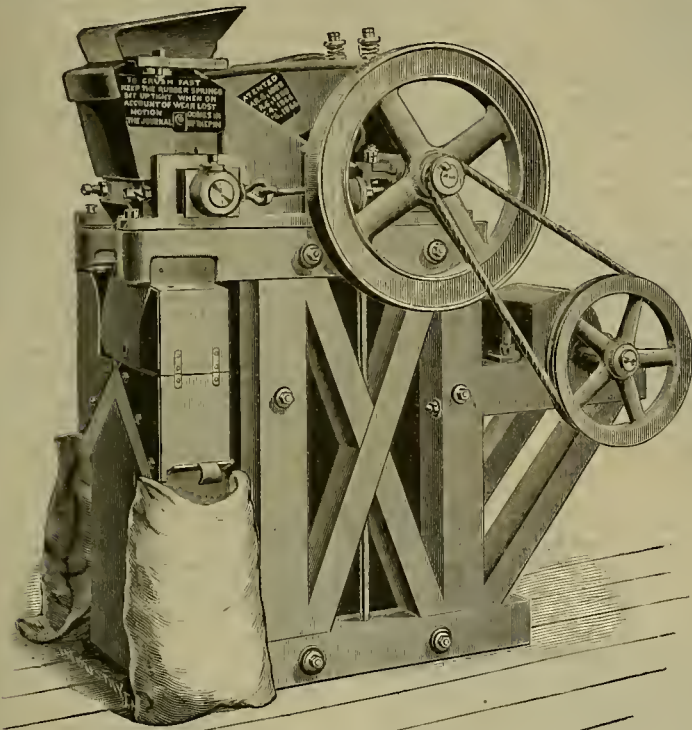
such mines as sack ore for long shipment, as fine ores will not cut the bags, and at the same time an invariably correct sample is taken for assay.

As shown by the accompanying cuts, the mechanism that works the sampler is driven by a belt from the shaft (8) of the crusher to an auxiliary shaft (28) on which is a drum (21). On one side of the drum is a stationary stud (24) with a revolving ring, while on the opposite side is a stud (23) with a revolving ring

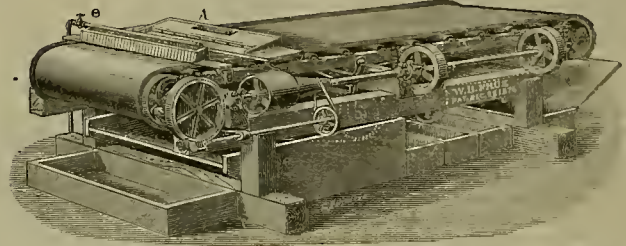
Concentrating California Tin Ore.

Report of a Competitive Trial of Concentrators.

The Frue vanner is a well-known machine for handling precious-metal ore, but has only now been applied to the concentration of tin ores, with which it has been found to be equally successful. With gold ores in many cases three ordinary Frue vanners to ten stamps will yield entirely satisfactory



THE DODGE ORE-SAMPLER



FRUE VANNER USED IN CONCENTRATING TIN ORES.

which is adjustable to ten holes (20), thus regulating the amount of the sample to be taken. These studs and rings revolve in an oil basin (22) which provides perfect lubrication, and in revolving strike the cam (19) which turns the "deflector" (14) from one side to the other, thus diverting the exact proportion of sample desired, as previously determined by the adjustment.

By changing the stud and rings a perfect sample is obtained, varying in quantity from one-tenth to one-half of the total amount of ore fed to crusher. This is one of the patents of M. B. Dodge now controlled and manufactured by the Parke & Lacy Co., 21 and 23 Fremont St., in this city.

work, and where the gangue is light, or the stamps not heavy, one Frue concentrator treats all the ore crushed with five stamps, and does perfect work; e. g., in the Empire Mill of 80 stamps (the property of the Plymouth Consolidated Gold M. Co. of Amador county, Cal.), 16 Frues are concentrating all the ore crushed by the 80 stamps. They are doing perfect work; the tailings assay merely a trace. In the 40-stamp mill of the Melones Consolidated Gold Mining Company of Calaveras county, Cal., eight Frue vanners are treating all the ore; the tailings assay nothing. But in order to be sure of low tailings, two of these machines are generally put to five stamps.

There are two styles of Frue vanners manufactured that handle five stamps each, or from 12 to 18 tons per day, and do it satisfactorily. One is the four-foot-wide Morse or Improved Belt Frue. This machine is doing double the work of the ordinary machines in many mills. At the Bailey Elkhorn mine it is handling 12 tons per day very easily. The other is the six-foot-wide plain belt machine. At the Standard mill, Bodie, four of these machines are handling satisfactorily from 60 to 70 tons per day. There are nearly 100 of these two styles of machines in use. Of the regular style Frue vanner there have been 3000 sold.

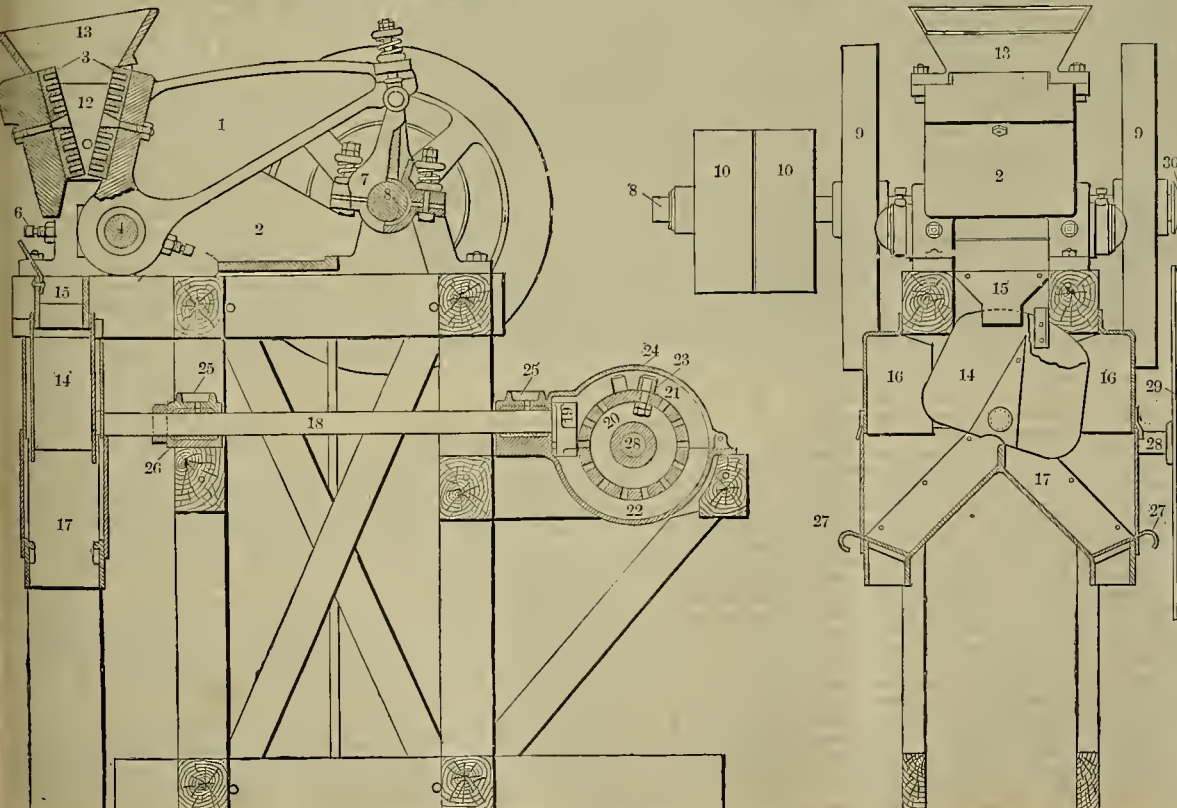
In concentrating tin ores in Cornwall with jigs and buddles, the ore must pass through the machines several times before it comes to the condition of "black metal" suitable for smelting. Experiments just made at the San Jacinto tin mines, San Bernardino county, prove that with the proper machines one concentration is sufficient to prepare the ore. The report of the competitive trial between the Frue and Woodbury concentrators on this tin ore will show the results accomplished. Following is a copy of the report:

CAJALCO, March 3, 1891.

Mr. E. N. Robinson, General Manager San Jacinto Estate, Ltd., Cajalco, Cal.—MY DEAR SIR: We started our test-mill on January 29th. The number of the screen at the battery was a No. 8, equal to a 32-mesh screen.

The Frue was the concentrator used. The concentrates yielded 66 per cent of tin metal. The tailings were sampled and tested, and were found to contain per ton of tailings, 11 lbs. cassiterite (yielding 70 per cent tin metal), equal consequently, to 7.7 lbs. of tin metal.

Nearly all the slime has been saved by this machine, and the greater part of the loss was found in the coarse tailings. I naturally came to the conclusion that the screen was too coarse for close



SECTIONAL VIEWS OF DODGE CRUSHER AND ORE-SAMPLER.

(Continued on page 201.)

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

South African Gold Fields.

Description of the Johannesburg Region.

EDITORS PRESS:—In the issue of your journal of December 13, 1889, I find a paragraph headed "The South African Gold Fields," relating to this place and the gold industry of these fields, which is calculated to convey a very erroneous impression, not only as to the conditions under which we live here, but also as to the importance of the gold discoveries themselves.

I may say that I am myself a native of America and came here four years ago. I am well acquainted with these fields, and, as my experience while in America was all in connection with mines and mining, I do not speak in ignorance in what I have to say as to this place.

The gold belt (i. e., what is known as the Main Reef series) extends for 30 or 40 miles, the town of Johannesburg being situated about the middle of the line, and the gold is deposited (with singular evenness) throughout, in what are known here as "banket" reefs, but which technically are deposits of conglomerate (cement). The value of these reefs varies at different parts of the line, but the milling results at all the mines (and there are some 1400 beads of stamps at work) for the whole of last year gave an average yield of 13½ dwts. per ton of rock crushed. As the mining work necessary is simple and inexpensive, averaging somewhere between six and seven dwts., the margin of profit is large.

In criticizing these fields, it must not be forgotten that their very existence was unknown and their place represented by open, uninteresting prairie four or five years ago. As the population was at that time without any experience of mining, the incompetence of those who first took the development of these reefs in hand was simply monstrous, and the place still suffers from their extravagance and ignorance. The disadvantage of amateur mismanagement was added to by the extreme isolation of the place, lying as it did over 400 miles from the nearest seaboard and over 300 from the nearest railway line. Thus, all the supplies for the mines, and for the support of the immense number of people who quickly collected here, had to be brought along tracks, not deserving the name of roads, by ox-wagon, thus making every necessity expensive and adding enormously to the cost of mining. However, railways are nearing us from all the ports of South Africa. We have a fine town with substantial stone and brick buildings two and three stories in height (both public and private), churches and schools well attended, and all the accessories of the most advanced civilization. Men have their wives and families here, and these are as safe from insult or interference in the public streets as at any American town or city. At no time was there at Johannesburg any semblance of the lawlessness, vice and disorder that characterizes most American towns, as as your paragraph inferred. Any man who carried a revolver here would be subjected to such a round of chaff and practical jokes that he would soon be glad to leave the weapon round home. As for gambling-hells, the police of the State would soon break up any that opened their doors. My personal acquaintance with many American mining-camps, as some of your readers will probably know, has been long and varied, and I unhesitatingly aver that Johannesburg never bore any trace of resemblance to them.

As some of your readers may take more than a passing interest in this new El Dorado, I have obtained and inclose you the official returns of the Witwatersrand Chamber of Mines for last year. [See editorial pages.—EDS. PRESS.] These will show that the presence of gold in quantity here is actual; that that gold can be profitably worked is shown by the regular monthly dividends some of the companies are paying. £165,000 sterling, i. e., \$825,000, was paid away in dividends to shareholders last month.

This is surprising even to me in face of the fact that most companies of these fields were floated in "boom" times at capitals that more than half went to vendors, promoters and brokers. Our output for last month will be between 52,000 and 53,000 ounces. It progressed in 1890 from 35,000 to 50,000, and in 1891, with new batteries on well-developed mines being completed all along the line, it shows every promise of increasing from 50,000 to 70,000 ounces.

These reefs, your readers must bear in mind, are not quartz reefs, rich in one place and barren in another, but bear gold regularly throughout their 36 miles of length. They are proved to 700 feet in depth by prospecting workings and by the diamond drill and there is every indication that they continue indefinitely. So far as my knowledge, both personal and from books of authority, extends, there is nothing like it in the world, and this vast mining area has up to the present been, figuratively speaking, merely scratched. The fields offer perhaps as great facilities as any other in the world for the profitable investment of capital, and it is and has been a matter of regret to me that Americans have not had a larger share in the

profits which have accrued to those concerned in the advancement of the place.

It is not however, too late, for the enormous capabilities of the banket formation are yet only on the threshold of exemplification, and I write this somewhat lengthy letter chiefly in the hope that your remarks may not lead my countrymen to suppose that this place is a humble city that will burst ere it is yet formed, or deter them from obtaining interests in the many good things the Witwatersrand fields holds out.

I trust you will be able to find room for this, I fear, rambling effusion. I may in conclusion say that your estimable journal is read here with great interest, not alone by Americans, but by many deep-thinking men of other countries, who are interested in mining.

C. R. KEHLER

Johannesburg, South African Republic, Feb. 6, 1891.

Facts About Weather Forecasts.

The Pacific Branch of the National Weather Service.

Lieut. John P. Finley, in charge of the Division of the Pacific Signal Service, U. S. A. has issued a bulletin giving the following facts about weather forecasts in this region:

The branch office of the National Weather Service, Division of the Pacific, was opened at San Francisco, March 1, 1885, and is the only office of its kind in the country outside of the central office at Washington, D. C. It was established for the purpose of providing, in the most direct and practical manner an opportunity for the people of the Pacific Coast to receive all of the benefits that may be derived from the work of the Signal Service. The main object was to prepare and distribute through the press and by telegraph, weather forecasts for the Pacific Coast States, and warn vessels of the approach of storms dangerous to shipping off the coast. Also, to make special forecasts of rain, frosts, floods and local storms. Such work had been carried on at the central office at Washington many years for the eastern portion of the United States, and it was believed that the time had come for the organization of a Pacific Coast Weather Service, with headquarters at the metropolis of the coast, and at a place centrally located for the convenient receipt and distribution of telegraphic reports. To properly apply the weather forecasts to definite areas of country, the Pacific Coast was divided into three districts, designated officially as follows: North Pacific region (embracing Western Oregon and Western Washington), Middle Pacific region (embracing the western portion of California, north of parallel 37 degrees north, or an east and west line cutting the northern edge of the bay of Monterey), South Pacific region (embracing the western portion of California south of parallel 37 degrees north). On May 1, 1886, an order was issued from Washington changing the districts to State areas, and thereafter the weather forecasts were made for the following regions: Washington (embracing the entire State), Oregon (embracing the entire State), Northern California (embracing that portion of the State north of the latitude of 36 degrees, or an east and west line passing through the central portion of Lake Tulare). Southern California (embracing that portion of the State south of the latitude of 36 degrees. There have been several changes in the hours at which the forecasts have been prepared for issue, dependent upon the hours of meteorological observation and the convenience of the press. Observations are now taken throughout the United States at 8 A. M. and at 8 P. M., 75th meridian time, which corresponds to 5 A. M. and 5 P. M., Pacific time. The weather forecasts are issued from the San Francisco office about 9:30 A. M. and 6:30 P. M. daily. An earlier hour cannot be selected because of the want of telegraphic facilities in concentrating the reports at San Francisco from all parts of the Pacific Coast States. The language of the forecasts must largely conform to the official instructions issued from the central office at Washington.

Forecasts of higher or lower temperature are made each morning with reference to the expected minimum temperature of the following morning, and each evening with reference to the maximum temperature expected on the following afternoon. The forecasts of stationary temperature indicate a change of four degrees or less from March to October inclusive, and six degrees or less for the remaining months of the year. In the case of higher or lower temperature a change of one degree or more is sufficient to verify the forecast. A cold wave, in general terms, is defined to be a fall in temperature over an extensive area of 20 degrees in 24 hours, or 28 degrees in 48 hours and to the freezing point or below. Warnings of cold waves are issued when it is expected that the area affected will exceed 100,000 square miles in extent, and in well defined cases for a lesser area. Forecasts of fair weather mean an entire absence of rainfall, but not necessarily an absence of clouds. Forecasts are usually made for a period of 24 hours, but whenever the meteorological conditions are so decided as to dominate the present, and are expected to materially modify coming weather over any extensive part of the country, forecasts may be made for periods of 36, 48 and 72 hours. Generally speaking, it is more difficult to forecast accurately the weather of summer than that of winter, because of the absence in the former season

of well-defined storm centers, most of the precipitation being the result of local changes in temperature and wind direction. For a similar reason it is more difficult to forecast the changes of a moderate storm than of those which attend a severe one, because in the latter case the laws of cyclonic development and progression are more closely adhered to, which permits the principle of weather forecasting to be applied with greater success.

Irrigation in Arizona.

The following is the introductory portion of a census bulletin by F. H. Newell, for which we are indebted to C. C. Babb:

The total area in Arizona on which crops were raised by irrigation in the census year ending June 30, 1890, was 65,821 acres, or 102.8 square miles, less than one-tenth of one per cent of the entire area of the Territory. The aggregate number of farms was 1448, and of these 1075, or 74 per cent, depended upon irrigation, the remaining 26 per cent being stock ranches, or farms situated high in the mountains, where crops can be raised by what is known as "dry farming." The average size of irrigated farms, or rather of the irrigated portions of farms on which irrigation was practiced, was 61 acres. In this connection the term "irrigated farm" is used to include only the area on which crops were raised by irrigation, the noncultivated portions of such farms not being taken into account. With this understanding the irrigated farms or areas cultivated by each person have been classified as follows: Seven irrigated farms of 640 acres or upward, 15 of from 320 to 640 acres, and 57 of from 160 to 320 acres. These 79 farms contain an average of 237 acres each, and have a total area of 22,656 acres, or 34 per cent of the entire amount watered in the Territory. The remaining 996 farms, under 160 acres in size, comprise only 66 per cent of the total irrigated area, and average 43 acres each. In other words, seven per cent of the farmers of the Territory owned over one-third of the productive land, and the remaining 93 per cent of irrigators owned an average of 43 acres each.

Counties.	Number of irrigators.	Total irrigated area in crop, acres.	Average size of irrigated farms in products, per acre.
Apache.....	182	5,545	30
Cochise.....	52	2,372	46
Gila.....	18	815	46
Graham.....	199	7,656	38
Maricopa.....	327	35,212	108
Pima.....	85	3,085	36
Pinal.....	115	6,010	51
Yavapai.....	91	3,762	41
Yuma.....	6	555	93
Total.....	1,075	65,821	61

Taking all the counties in the Territory, with their varying conditions, the average cost of water right was \$7.07 per acre. This includes all cases, from the one extreme, in which the farmer dug his own ditches from the river—the cost of water right in that case being the amount which the ditch cost him in labor and material—to the other extreme, in which he purchased his water right from some company, paying a certain sum per acre for the privilege of renting or buying water each year. The selling value placed upon this by the farmer, whenever his right was transferable, was \$12.58. The average annual cost for water was \$1.55 per acre, this expenditure being either in labor in keeping the main ditches and dams in repair or paid as a cash assessment or rental to an association or corporation.

Besides the first cost of the water and the annual assessment for its use, an estimate has been made of the first cost of bringing the land from a wild state under cultivation by irrigation beyond the expense for the water right. This estimate, which is \$3.60 per acre, includes the cost of plowing, grubbing sagebrush, cutting mesquite, fencing and leveling, or otherwise preparing the ground for irrigation.

Assuming, then, that the original purchase price of the land was \$1.25 per acre, the cost of preparing for cultivation by irrigation \$3.60 per acre, and the first cost of water right \$7.07 per acre, the land cost the original owners a total of \$16.92 per acre. It is ascertained, for comparison with this, that the average valuation, including buildings, fences and other improvements of the land on which irrigation is practiced, is placed by the owners at \$48.68 per acre, showing an apparent profit, less cost of buildings, of \$31.76 per acre.

In comparison with the annual outlay for water, it is found that the average annual value of farm products is \$13.92 per acre, leaving the farmer \$12.37 per acre per annum as a return for his labor and as interest on his investment.

The agricultural and irrigable land of Arizona is situated in the southwestern half of the Territory. If a line be drawn from the northwestern to the southeastern corner diagonally across the Territory, this line will lie for a greater portion of the distance along the face of the great escarpment which divides the high plateaus from the plains of the Gila basin. Against the face of this escarpment the larger portion of the available moisture is precipitated, rolling back to feed the tributaries of the Gila, thus rendering possible a certain amount of irrigation in the narrow valleys, especially on the Gila and Salt river plains near the point where their waters leave the canyons. High up on the edge of the plateau country and among the mountains, at elevations of from 5000 to 7000 feet, a little agriculture is successfully carried on without irrigation, usually

in connection with stock-raising or in the immediate vicinity of mining towns. The crops raised, however, are comparatively insignificant.

The acreage at present under irrigation may be regarded as approaching the maximum possible with the present supply of water and methods of using it. In other words, all the easily available water has been utilized, and expansion can come only by a greater economy in the use of the existing supply or by the adoption of systems of storage for the conservation of the flood-water now annually running to waste. The irrigators look forward to the latter alternative as the most effectual means of obtaining relief from present troubles and uncertainties. Progress in this direction will, however, be slow, from the necessity of a large outlay of capital before any return can be realized, and from the fact that the controllers of capital, whether governmental or private, have had comparatively few facts on which to base reliable estimates. The amount of water that can be reserved by storage is known from common observation to be very large, but it is usually greatly overestimated, from the fact that even a small volume of water, coming all at once and with great velocity, is often extremely destructive and creates a vivid impression, while the same amount, if distributed through as many days or weeks as it is hours, would not excite comment. Measurements have been made in a few instances by engineers and by the United States Geological Survey, but the operations of the latter were discontinued before a range of mud over a year had been obtained. For example, taking what is probably the best storage site in Arizona, that on the Gila at the Bottes above Florence, the mean discharge at this place, as shown in the eleventh annual report of the Director of the United States Geological Survey, from September 1, 1889, to August 31, 1890, when operations were suspended, was 503 second-feet, averaging 1000 acre-feet per day, or 365,000 acre-feet for the whole year. Assuming a water duty of 100 acres to the second foot, this, if all the water could be stored, would irrigate 50,000 acres, instead of the 7000 acres or less now irrigated in the vicinity of Florence. A large reduction from this theoretical amount must, however, be made for losses by evaporation and seepage. Without going into a discussion of the measured water supply, this will suffice to show that it is possible to determine the volume and intensity of floods, and that when this has been done the water-storage problem will be in a fair way to solution, since only then will it be possible to prepare reliable estimates of costs and profits.

Resources of Alaska.

In concluding a long report upon the wealth and resources of Alaska, Special Agent Petroff of the Census Bureau, in a bulletin just issued, speaks as follows: "In this survey of the wealth and resources of Alaska the observer is struck with one rather discouraging feature—that all those vast resources, the products of land and sea, are taken out of the country without leaving any equivalent to the inhabitants. The chief industries, such as salmon canneries, cod fisheries, mules and the fur trade, are carried on with labor imported to Alaska and taken away again, thus taking out of the country the wages earned. Every pound of subsistence for those laborers, as well as all the clothing they use, is carried by them into Alaska.

"The shipping of Alaska, which has become of considerable value, is also carried on wholly by non-residents of the Territory, chiefly from California, Oregon and Washington, and this state of affairs extends even to the important tourist travel to the southeastern district of Alaska. Not only the passage money, but the whole cost of subsistence of these tourists during their stay in Alaska, goes to the California owners of the steamship lines. To give an idea of the magnitude of this traffic it is only necessary to state that the number of tourists' tickets sold each season exceeds 5000, each ticket representing an expenditure of not less than \$100, making a total of \$500,000. The insignificant payment for fire and labor to natives are absorbed entirely in the purchase of small quantities of food and raiment.

"The spectacle of so vast a tract of country being thus drained continually for 23 years without receiving anything to speak of in return cannot probably be equaled in any other part of the United States, and perhaps of the world. At the same time the only prospect for a change in these circumstances, by immigration and settlement of people, who could supply the demand for labor and develop the industries as residents of the country, would appear to be still in the far distant future."

COAL RECEIPTS.—The receipts of coal so far this month have averaged 4000 tons a day or 1000 tons a day in excess of the consumption. The receipts for last month averaged 5000 tons a day. A large number of cargoes are on the way here from different ports.

THE last report of the Chicago City Railway shows that on its line the operating expenses a horse-car mile were 21.95¢ cents, and a cable-car mile 9.65¢ cents. The company ran 12,740,480 cable-car miles and 4,859,200 horse-car miles.

Romneya Coulteri.

[Written for the Press by C. R. ORCUTT.]

One of the most charming of California wild flowers is the large, perennial white-flowered poppy, *Romneya Coulteri*, which has been favorably known abroad for many years, and has in recent times been rediscovered, so to speak, by California.

The genus was named *Romneya*, in honor of the Rev. Dr. T. Romney Robinson, a noted astronomer of Armagh. It is a shrub, usually from 5 to 15 feet in height, half-woody at base and does not die down but needs to be pruned well back in the fall. It is one of the finest of California plants. In early spring vigorous shoots start from the dormant roots and grow from 6 to 10 feet high. The large hairy buds open at daylight; the crimped petals slowly unfolding from over the huge bunch of stamens (the bunch as large as a walnut) until they spread out from 6 to 9 inches. They last several days, the buds opening well in water.

The foliage is very effective, and makes with the flower a very beautiful and artistic study. There is a delightful harmony between the much-divided glaucous foliage and the waxy-white flowers, which make it much admired as a decorative plant.

The *Romneya* occurs from Santa Barbara county, southward into San Bernardino and San Diego counties, and below the Mexican boundary nearly to San Quintin bay, Lower California. It is seen at its best in San Diego county and in Lower California, where it may be found growing along the borders of streams, in the richest and most fertile portions of our valleys, or on the dry mountain or hillsides and in sheltered canyons on the warmest, driest and most unapproachable slopes. It is mainly confined to the foothills and valleys near the coast. It is easily domesticated as far north as San Francisco, and with us is quite a hardy shrub, requiring only a sheltered position to protect the flowers.

A rich sandy loam soil is most suitable. The species may be increased by seeds, sown in spring, but only the most careful and painstaking are usually successful. The seeds do not germinate for four to eight months or longer. With care the roots may be readily transplanted. Cuttings may also be made to grow. Single plants do not seem to mature seed in cultivation, but when grouped, as in the wild state, the seed mature abundantly. The stems multiply rapidly from the roots, until a single plant will occupy a considerable area.

W. Goldring, writing from London (*Garden and Forest*, i. 291), says of the *Romneya*:

I have just seen this glorious flower in Kew gardens. With us it is one of the rarest and choicest border flowers we have. One need not be an enthusiast to admire its great satiny blossoms of snowy whiteness and adorned in the middle with a tuft of stamens like a golden tassel. It has the reputation of being a "miffy" plant—that is, it wants much attention and then often does not reward us by behaving well.

There is now a considerable home demand for this handsome shrub, and for California homes there is no plant more desirable for the lawn or garden. As a pot plant in the East and Europe, it is eminently a success. It blossoms when small profusely, and while the flowers are not nearly so large as they can be grown with us, yet it well repays all the labor and care bestowed upon it. No picture can do this magnificent flower full justice. The waxy, delicate texture of the petals the pencil fails to reproduce as well as the airy grace of the plant itself. We wish we could place the reader before such a field of them as we have seen in the canyons of Lower California, where, climbing far up the mountain-sides, away from the reach of any but the most enthusiastic botanist, their numerous large white flowers show off, with startling beauty in the morning sunlight. It seems a pity so many should thus waste their sweetness so far from appreciative eyes, but the bright-winged butterfly harbors no kindred thought as he flits from flower to flower.

In the designation of a State flower by our State Floral Society, the choice lay between two so-called "poppies"—the *Romneya Coulteri* and the *Eschscholtzia Californica*—the latter winning not upon beauty but upon its greater elements of popularity.

The Leading Industry.

Last week a contemporary gravely asserted that it was humming to think that Utah had in great part to depend upon mining for its prosperity, and cited the fact that notwithstanding Nevada mines had yielded largely, no particular benefit had accrued to that State. And when we tried to answer that about all the prosperity of this Territory really was due to mining, that it was that great business which kept the arteries of trade in the Territory bounding with life; this contemporary came back and inhaled on its first proposition, and carried the idea that a town like Provo as compared with a town like Park City was a certain evidence that the Territory relied more on other things than on mining. Thinking that perhaps an object lesson would be better than anything else to show the truth to a contemporary so perverse as is ours, we applied to the Ontario Company for the figures of last year,

and Mr. Thomas Almy kindly gave us the subjoined:

OUTPUT ONTARIO SILVER MINING CO. YEAR 1890.

Ore sales.	Tons ore.	Fine oz. silver.	Sold for.
Bullion.....	12,038	812,750.02	\$ 765,318.93
.....	23,692	984,200.71	1,086,765.47
Total.....	35,985	1,796,950.73	\$1,742,084.40
Dividends, 1890, 12 of \$75,000 each.....			\$ 900,000.00
Disbursements, 1890 (dividends not included).....			1,117,055.06
Disbursements directly in Utah, viz.:			
Pay roll and salaries.....			\$ 635,000.00
Cord wood.....			84,180.75
Lumber and timber.....			35,649.60
Coal (from Coalville).....			81,704.22
Salt.....			29,662.82
Castings (Salt Lake foundries).....			12,807.10
Beef and vegetables (no groceries).....			21,724.03
Hauling and sampling ore.....			55,853.10
Total.....			\$ 806,731.52

Many other supplies, such as powder, oil, candles,

we believe one-half, or close to one half, was invested right here. The theme might be elaborated upon to any extent, but the foregoing is sufficient to show that our contemporary sometimes does talk as do the foolish talk.—*Salt Lake Tribune*

Forests and Floods.

Ten years ago I wrote a pamphlet setting forth the fact that considerable areas of brush and timber in the foothills and mountains were being burned off every year and the brush on some small portions of such burned districts was being dug out by the roots. The result of undue forest or brush destruction was shown to have been in other countries an increased flood flow and torrent action on the one hand, and on the other a diminished supply of permanent perennial water in either wells,

fires and the consequent increased detritus delivered by the mesa and mountain streams. Flood water thus charged with sand, stones and howlers has an erosive power similar to air charged with sand and used as a sand blast. It is for this reason that we see barrancas, gullies and washouts where we formerly had none. No farm in a bottom land near any stream is now safe. This is true not only from the increased cutting power of the streams, but also because the capacity of water to carry detritus depends on the gradient of the water flow. After fires or other denudation the streams usually come out of the steep mountain grades charged to their full carrying capacity with detritus. As soon as the lower grades are reached some of the load must be dropped. Such deposits fill up the stream bed and there must be a continuous tendency in such streams to break into new and unexpected courses and to do great ruin.

Our remedy is a forest policy such as necessarily has forced upon all civilized countries but ours. Riparian timber should indeed be cut, the forests should indeed supply us with firewood, but the forest can and does in other countries provide man's wants without any necessity of forest destruction. As for the fires that every year heat the hot autumn, superdry the air already overdry and mar and waste our mountains, they are inexcusable on any ground. They are sometimes caused by negligence, but the great majority are purposely set. One hundred and fourteen fires started in separate and distinct places in the mountains and foothills of the Santa Monica range last year between the Rodeo ranch and the Malibu. Some of these burned only a little way, others extended over miles of territory. One of them nearly burned up the pavilion at the forestry station, and did burn large quantities of the trees planted on the forestry ground. Fires are the forerunners of floods. Every year our arroyos and torrents widen their beds; every year some stream changes its course; every year the damage by flood of a given rainfall increases. And this is only the commencement. Many countries have been ruined by forest denudation unchecked, and civilized countries have come to an appreciation of the facts, and have after an expensive schooling taken their precautions in a national forest policy. To indicate what the cost of these forest lessons is, we may cite the valley of the river Durance in France. This stream rises in a mountainous country originally forested. The trees were cut and rafted out, sheep were introduced, the brush burned, and the mountains quite denuded. The result was the cutting away by floods or the covering up by torrent detritus of 200,000 acres of fine lands in this single valley.

We must all join together and stop this wasteful and dangerous destruction of the coverings of our mountains.

Large numbers of trees have been planted in Southern California, but these are all in the valleys, and while helping the climate cannot control the flood-waters coming from the denuded mountains. These must be controlled in the mountains and foothills.

Levee districts are an expensive palliative for the results of forest fires. There never can be a remedy. The difficulty of holding an effective levee can be seen on the Los Angeles river, where great expense has been gone to by the railroad companies. Their levees are costly, unreliable, and made of material certain to rot out under ground. Besides the great first expense of any effective levee system to care for mountain streams, there is a still greater expense in the necessity of raising the levee banks from time to time. This necessity grows out of the inability of torrents to carry on the valley grades what they pick up in the mountain grades. Consequently the torrent beds rise above the general level and no levee can make them secure. So it may be observed that the outlet from the mountains of so many of our torrents is on a talus or deposit of sand, stones, etc., higher than the surrounding country, and this must become more and more the case as mountain denudation increases.

I have seen levees to hold torrents on the Italian side of the Alp valleys, 78 feet high and then only 18 feet above the bottom of the torrent bed. This taller torrent is consequently at its bottom 60 feet above the surrounding country. I have stood on this levee and looked down on the top of four-story houses in the city of Bozen.

I suppose that it is impossible for the people to realize what a mountain torrent in a country like ours will do. I suppose that it is impossible for them to realize that the true and only reliable remedy is in the mountains and not in the plains, is in the brush and forests, and not in levees. Premising that we can only hope for palliation at present, it may be well to suggest that one of the best flood and torrent breaks in this country, where water is permanently near the surface, as in all the river country below Los Angeles, is the willow hedge. The willow brush should be cut from five feet long, and set about 2½ to three feet below the surface of the stream, and close to and under the bank to be protected. It must then be wired together thoroughly. In case the exposure is great to strong currents, a scantling or good post should be driven in deep, every ten feet, to anchor the wires. The next season this will form a living levee that no flood will move. No insects injurious to fruit trees harbor in willows. I speak from experience, having in a mountain district as road overseer taken this measure of protection, and never lost a culvert, grade, canyon road, nor bridge.—*Abbot Kinney, in L. A. Express.*



OUR GRANDEST WILD FLOWER—*Romneya Coulteri*.



ROMNEYA COULTERI—REDUCED FROM LONDON "GARDEN."

machinery and groceries, were purchased of Utah merchants.

He adds a note in which he says that the disbursements in cash per month from the Salt Lake offices are \$80,000; 80 per cent of this is paid out at Park City, 18 per cent at Salt Lake City, and two per cent in foreign remittances. It will be seen that the receipts of the mine last year amounted to \$1,742,084.40. The mine paid in dividends \$900,000. The disbursements amounted to \$1,117,055.06, and in Utah for salaries, the pay roll, cord wood, lumber and timber, coal, castings, food, etc., the disbursement amounted to \$806,731.52.

Probably this is as prosperous a mine as there is in Utah. There are but four other mines in Utah that compare with it, and yet we see that half the product must be given up for labor and supplies, and this was paid out in Utah. With most of mines the expenses as compared with the profits are two or three to one. Of the amount paid out in dividends by the Ontario last year, one-quarter at least, and

springs or rivers. In a mountainous, and especially in a dry mountainous country, these results were shown to be prompter and greater than elsewhere.

The warning was then given that unless some check was put upon the denudation by fire of our watersheds, very serious consequences would be likely to ensue. Ten years have passed and ten fires and waste have gone on. Is it not now possible from our experience to say that in proportion as a mountain watershed is denuded so much the greater will be the flood flow for every inch of rainfall?

As the watersheds are denuded, the water flowing from them carries more and more sand, stones and soil. This detritus is added to the volume of the water. From my own measurement I believe that one-third of the volume of our torrents in floods is often composed of detritus. Of course this adds greatly to their erosive power, not only as to volume but as to erosive or cutting capacity. This feature of our torrents owes its great recent increase to mountain

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alpine.

A LOOKED-FOR REVIVAL.—Genoa *Courier*, March 21: It is reported that an English company has taken hold of the Colorado No. 2 in Alpine county and that \$10,000 is to be put up within 60 days for the purpose of opening the tunnel and making other preliminary arrangements for commencing regular work. It is further stated that the company must put up \$240,000 by the 1st of next July or forfeit their right to the property. Just how much importance is to be attached to this statement we are unable to say, but some of the residents of Alpine confidently look for a revival of the mining interests. Dan Coffin recently sent on and had the Good Hope claim, situated a few miles above Markleeville, relocated and expects to snout put a few men to work. The claim is situated within sight of the stage road. There is a good millsite where the ore, which is free milling, can be run from the mine to the mill in a chute. This mine was abandoned some years ago and the last ore taken out worked \$6.25 to the ton and it is now believed that it can be made to work \$11 a ton. D. Bari was working the old Leviathan copper claim above Monitor, but suspended work during the storm. The ore is very rich. This mine was worked years ago.

Amador.

MILL MOVED.—Amador *Dispatch*, March 21: The old Hardenburg mill has been removed from its former site near the bank of the Mokelumne river at Middle Bar, and will be replaced near the working shaft of the mine, where large quantities of good-looking ore are being taken out. It is thought that the mill will be ready for operation in about a month.

PLYMOUTH CON.—Amador *Ledger*, March 21: This company's eastern office is in receipt of the following news from the mine: The upraise is 35 feet above the tunnel. The vein is two feet wide and carrying high-grade ore.

BELMONT.—The superintendent of this mine reports the surface tunnel has been extended 25 feet the last week. Mill is running daytime on ore from face of tunnel; 30 feet yet remains to be driven to where the vein is said to be 20 feet wide, which will enable the company to keep their 10-stamp mill supplied full time.

MISCELLANEOUS.—The water has been taken out of the Bell Wether claim, and two shifts are employed in sinking operations. The one-stamp mill of the Amador gold mine was employed last week in a test crushing of the cement and gravel left by the placer operations on Red hill in early days. We are unable to say how it turned out.

SUTTER CREEK.—The laying of pipe for the Maboney mine has commenced. The ditch for the pipe is almost finished, and inside of three weeks they will in all probability have all connections with the mill-and ditch made, when crushing on surface ore will be commenced. A bridge is to be built across Sutter creek to carry the pipe. It will be in close proximity to the bridge of the Amador canal and very similar in construction, although not so heavy. It will cost in the neighborhood of \$400. The mill is being put in thorough repair, and will be in readiness to commence operations as soon as the other work is completed. The Lincoln mine, after a short rest, is running again with good prospects of a steady run.

Calaveras.

ENCOURAGING PROSPECTS.—*Mountain Echo*, March 19: There is being considerable work done on the pocket vein belonging to Thos. Hardy & Co., situated near the Marble springs, near this town. Several hundred dollars were taken from one pocket one day last week, and flattering prospects have been made all along the vein. The gold found in this vein is said to be the heaviest and finest of any found in this locality. That there is a large deposit of gold somewhere along the vein there seems to be little doubt, as indications point strongly that way.

UTICA SHAFT.—A contract is let to sink the south shaft at the Utica mine in this town 230 feet deeper, which will make the total depth when completed, 800 feet. This shaft will tap the vein deeper than any shaft ever sunk in this locality.

El Dorado.

NEW MILL.—*Mountain Democrat*, March 21: Doc Pratt's mining ventures have turned out so well that during the past week he has had a new mill constructed for his claim, and soon the sounds of the big whistle on the hoisting works will announce the beginning of business therein.

Inyo.

RICH FLOAT.—*Register*, March 19: Scott Broder is coming over the toll road between Deep Springs and Big Pine a few days ago, picked up a piece of rock that attracted his attention. On breaking it open it was found to be peppered all through with gold—enough to give an assay value per ton running way up into the thousands. The piece shown the *Register* was the richest specimen we have ever seen in the county, not excepting the Keynot of years ago. The prevailing rock in the neighborhood of where the chunk was picked up is slate. The ledge from which this float came has not been found as yet.

Nevada.

A LIVE DISTRICT.—*Transcript*, March 24: There are estimated to be about 400 men mining for quartz at Maybert and Ormonde, Washington township, and in the vicinity of those places. The Yuba mine has 75 men and runs 25 stamps with good results. The Eagle Bird has 100 men and 30 stamps are pounding out gold. The Washington works 40 men and 20 stamps are pounding away at a nice profit. There is between \$10,000 and \$12,000 disbursed monthly for wages. Much prospecting is going on all through that section. Fritz Meister is getting ready to start up work on the rich ledge in litigation between him and Capt. Donahue. At the Bluebell the ledge, lost some time ago, has been rediscovered and looks splendid. On Canyon creek the White Brothers are running a tunnel to open a promising deposit of ore. John Lynne is getting ready to begin work at his claim on the ridge above Canyon creek.

THE ST. JOHN MINE.—*Grass Valley Union*, March 25: The ledge in the St. John mine now

shows a width of six feet of gold quartz, and it all looks like good milling ore. But little of the quartz has been taken out as yet, the work being mostly confined to the stripping of the ledge, but occasionally crosscuts are made to determine the quality of the quartz. It shows well in mineral and prospects in free gold.

Placer.

AS RICH AS EVER.—*Placer Herald*, March 21: We received a pleasant call last Saturday from Mr. A. Breece, late of Bath in this county, now a resident of S. F. Mr. Breece and Judson Wheeler are the owners of the Paragon drift mine at Bath, and while the Paragon has been a liberal dividend payer for many years, the present prospects of the mine are as encouraging for the future as at any time in its history. In working their old channel, the main direction of which has been a little west of north, they have cut into a new channel, coming in from the east toward the Hazard claim in Volcano canyon, which is extensive and rich. They own 5000 feet on this new channel which so far as prospected is from 200 to 300 feet wide; the gravel on an average pays \$6 to the car and can be taken out at the rate of two cars a day to the man. Contemplate a bed of gravel 5,000 feet long, say 250 feet wide, six or eight feet deep, which contains for its owners from \$3 to \$5 of net profit for every miner's car load, then you can form some conception of the richness and extent of the famous Paragon drift mine in Placer county.

THE GRAY EAGLE.—We received a call last Wednesday from W. F. Eicke, foreman of the Gray Eagle drift mine, located on the ridge about five miles this side of Forest Hill. So far, work on this mine has been mainly in the way of prospecting the property, but the prospecting has now sufficiently advanced to render certain the existence of a rich and extensive channel which promises soon to yield big returns to the lucky owners. In the main tunnel at 253 feet from the mouth they ran into the channel. For 200 feet the tunnel has been continued through the gravel, and yet the channel has not been crossed. The gravel above the tunnel followed back on the rim is very rich, and at 1700 feet from the mouth of the main tunnel an upraise has been made which at about 140 feet is expected to cut through to the gravel, and which, Mr. Eicke thinks, will probably be finished by the time he gets back. The gravel from the higher rim or upper channel will be worked through this upraise, while the gravel in the main channel below the level of the main tunnel will be worked through the said main tunnel, the mine being kept dry by pumps put in for that purpose. Considerable gravel has already been taken out, but so far none to speak of has been washed. Everywhere it prospects rich and it is known to be extensive, and the company feel fully assured now that they have a big and rich mine.

THE ECLIPSE MINE TROUBLES.—*Nevada Transcript*, March 20: The trouble about the Eclipse mine of Placer county, which was partly owned and wholly managed by J. B. Patterson, once an Assemblyman from this county, is not yet ended. The latest is another attachment levied by J. G. Fredenburr, a well-known citizen of this county, who kept the boarding-house while the mine was running. This attachment is upon the personal property of the company for over \$500 for board furnished the men and a few other smaller claims which make the total \$577.40. Schaw, Ingram & Batcher, a Sacramento firm, are putting into force an execution on a judgment obtained in Sacramento county for \$683.47. This amount is for merchandise sold to the Eclipse Mining Co.

San Diego.

AROUND JULIAN.—*Sentinel*, March 20: Work is being pushed on the Helvetia and High Peak mines by W. O. Havermale. Cheering reports continue to come in from the Mesa Grande mines, notwithstanding the stubborn litigation in progress. There is considerable activity now going on in the mines along the line of the new grade between Julian and Banner. The first we notice in passing down the road is Messrs. Garrison, Burke and Murphy who have a lease on a portion of the Gardner mine and are getting things in shape for a profitable summer's work. The west half of the Warlock mine has been leased by Holland & Co., four hardy miners who have taken hold in earnest as though they mean business. The east half of said mine has been leased by William & Co., who have flattering prospects for the coming summer. The Warlock has long been considered one of the best properties in camp. The vein is not large, but rich, milling from \$60 to \$100 per ton. We are glad to see the miners taking hold of ground on their own account. The camp would be better off to-day if more of that kind of work had been done in the past. The most important strike made in camp of late is reported at the Antelope and was made by Charles Dwyer, foreman of the San Diego & Warlock Mining Co. Dwyer is a very quiet man and says but little, but all who know him say he is an A. 1 miner. He has—we are informed—leased from the superintendent, John I. Minear, that portion of the ground on which the rich ore was uncovered. This strike in the Antelope is no surprise as it is a well-known fact that the Antelope has turned out some of the richest ore ever mined in the camp. The Blue Hill tunnel—from which grand results are expected by all who are familiar with the locality—is now into the mountain 500 feet. The present contract calls for 1000 feet. Work is well under way at the Fraction and Cable mines. A crushing of ore has just been put through the new mill of the Gold King & Queen Co., at Banner, with satisfactory results. Rich ore from the Cincinnati Belle mine is now being milled at the company's mill. The Ready Relief mine, as usual, is turning out fine ore, but nothing else is ever expected of it. Work at the King and Queen is being carried on in an extensive manner by Supt. Wilkins. The company has a complete plant and is making good use of the same. The Stonewall mine, which has been reported played out just 947 times in the last 20 years, still manages to keep the 20 new stamps running night and day and is doing far better than her traducers. In fact the mine is showing up splendid ore in the lower levels and those who have had their pencils sharpened for the last three months to write her obituary had as well look for other employment. The Wilcox mine is being developed and is a promising piece of property. Rumors are afloat to the effect that the Owens will resume operations the first of April. Charley Minear's 8-horse team has arrived with the remainder of Kerr's new mill

and it will soon be in operation; then miners can get their rock worked in any quantity from half a ton up and at a cheap rate, which will give the miner more independence than he could ever before assert in the district. Considerable prospecting is being done and a disposition seems to prevail among the miners to lease and work property for themselves, which we look upon as the best indication of permanent prosperity in the camp. The outlook is indeed encouraging.

San Bernardino.

GAVILAN GOLD.—*Cor. Bulletin*, March 24: The Gavilan gold mines are situated ten miles from Cajalco, in the southeastern portion of the San Jacinto estate. Here the work of development is in charge of James H. Crossman, acting superintendent, under General Manager Colonel E. N. Robinson, and is slowly progressing. These mines are believed to be meritorious, but Colonel Robinson seems to think one thing at a time is a good rule to follow. When the tin mines are fully developed and on a paying basis, he probably will pay more attention to the Gavilan gold mines and their yellow product.

TIN FROM SAN JACINTO.—*Cor. Chronicle*, March 25: The small mill and oil furnace of the San Jacinto estate continues to run in a very satisfactory manner. The running off and capping of the oil furnace to-day under the supervision of Stephen Harris, the expert from Cornwall, was of a very satisfactory character. Hundred-pound bars of tin are being cast at the present time. The furnace will continue to run until it reduces all the black tin accumulated on the smelting-furnace floors. The result from the present smelting will be forwarded to San Francisco to illustrate and prove that tin can be produced in quantities and quality to meet the demand of the American market. The general manager, Col. E. N. Robinson, intends to make an exhibit before the Board of Trade in San Francisco.

Sierra.

SIERRA CITY.—*Cor. Mountain Messenger*, March 21: Sam Lock returned from below last week, and started work in the Chips' mine, stopped for some time by snow filling up the ditch. Work has again commenced at the Wm. Tell ledge, where five men are working. There can be but little doubt that this will prove to be valuable property, and the owners are going about the work in a business like way. With a little mill the mine has thus far paid expenses. The owners walk to the mine—no buggies—no livery bills to pay, and I think the future of Sierra City depends a good deal on this mine, although there are several others that will be worked this summer. The Butte Saddle, they say, is looking well. The men working there say they have a fine ledge. There are a great many idle men here, waiting I suppose, for the Mountain mine to start. From present appearances, the sawmills will have plenty of work this summer.

UNTRUE.—The report that a 50 ounce piece of gold had been found in the Ruby mine proves to have been untrue. A few weeks since a three or four ounce piece was found, and this has grown to 50 ounces.

EXTENSION.—The Bald Mountain Extension Co. made 32 feet with their main tunnel and 25 feet with their upraise, last week.

Siskiyou.

BLUE GRAVEL.—*Yreka Journal*, March 20: Lee, Lash & Co. have been taking out a great amount of blue gravel from their extensive claim at Greenhorn during the past week. The gravel is exceedingly hard on account of being packed so tight at bed rock, but crumbles easily after being exposed to the air for some time on the surface. The company works day and night shifts of eight men to each shift, comprising four men in the drift all the time. They are breasting up and down the creek, the channel taking an eastward course toward the Killdore hills in Shasta valley and across the southern tributary of Yreka creek on the east side of the Scott Valley road. The gravel taken out at present pays about an ounce a day to the pick, or two ounces each 24 hours to a drifter, and will probably average that amount, more or less, until the entire dam is worked out, which is likely to last several years. Some of the gravel taken out is so hard that it will not dissolve in water, and is laid aside for air slacking before washing. A blower will probably be put in the mine soon to force fresh air into the drifts for more comfortable work, besides digging another shaft when the drift is extended about 200 feet or more from the first or present pumping and hoisting shaft. Several new companies from Montague, Yreka and Shasta valley are prospecting in the Killdore hills, some three or four miles south of Yreka, with a firm belief that the blue-gravel channel can be found all the way from the vicinity of Yreka basin and Shasta valley to a connection with the blue-gravel beds of the Cottonwood creek locality near Henley and Hornbrook. Several shafts and wells sunk between Yreka and Montague show rich deposits of blue gravel, where the channel may prove very extensive. The blue-gravel leads on the east side of Yreka creek are all under the sandstone formation, and can be traced along the old Oregon stage road to Siskiyou mountain.

WINDGAMS.—The Klamath river miners are all busy in commencing work on windgams or making preparations to do so, by getting timber and lumber on the ground. Several companies are putting in cribs above Oak Bar on the lower Klamath, and similar work is in progress at Honolulu and above, on the upper Klamath. The Chinese companies all along the river, from Hamburg Bar to Hornbrook, are also reopening their claims by putting in windgams, and the prospects indicate more extensive mining operations on the Klamath during the coming summer than ever before known, with the certainty of realizing a larger amount of gold-dust than for a number of years past. The heavy freshets of last winter, while doing great damage to river claims, cleared out immense piles of accumulated tailings and boulders in the way, so that the stream is now in good condition for successful operations on a large scale. The directors of the Yreka Blue Gravel M. Co. are negotiating for a diamond drill, for the purpose of boring to find the locality and extent of blue-gravel deposits in this vicinity. Parties who have been exploring the country between Henley and this place, and out toward Staveout, Killdore hills, Cram's gulch and Orr's, believe that an inland sea or river existed in prehistoric ages to the extent of six or seven miles in width. Work will soon be commenced on the extensive cinnamon ledges in the Siskiyou foothills, on the west fork of Beaver creek, under the management of Mr. McGee, who is only

waiting for favorable weather to start operations. **S. H. MINE.**—*Cor. Siskiyou Telegram*, March 21: The S. H. mine started up two weeks ago with a fairly good head of water, which has increased slowly until at present we have a full head. Everything is running smoothly and the earth and boulders are being mopped into the flumes as fast as it is possible for 2000 inches of water to do it. The Low Hill quartz mine has suspended operations indefinitely, Mr. Eastman, the superintendent, having gone to Eureka to procure concentrators that he may be able to work the sulphates. Mr. Henry Murray of Callahan's Ranch, one of the last year's pipers, has returned and is plying the water to the bank very satisfactorily.

Trinity.

BUCK'S RANCH MINE.—*Journal*, March 21: W. J. Grigsby was in town Thursday on his way to San Francisco and informed us that the Buck's Ranch mine, in which he is interested, is doing very well. A recent crushing went between \$10 and \$11 per ton. This kind of ore will net the company about \$7 per ton, according to Mr. Grigsby's account of working expenses.

Tuolumne.

SHUT DOWN.—*Tuolumne Independent*, March 21: The Hesleg mine, at Quartz mountain, has been shut down for good, and will be gutted of its machinery. The closing down of this mine will have a somewhat depressing effect on the mountain, as it furnished considerable labor. We are informed that Mr. Wm. Phillips, who has for many years been foreman of the mine, wanted to lease the property, but the company refused. The Knox & Boyle mill, now owned by Mrs. A. B. Preston, will be refitted and repaired to do custom crushing.

NEVADA

Washoe District.

CON. CAL. & VA.—*Virginia Chronicle* March 21: 1200 level: Continue to extract some milling ore from above the line of the drift run north from the east crosscut No. 1 from the south drift from the shaft station. 1300 level: Have continued to extract some milling ore from the point where the upraise carried up from the end of the east crosscut from the south drift connected with the 4th floor stopes. 1500: The width and quality of the ore which is exposed in the opening 43 feet above the sill floor of this level continues to hold good. 1600: Have continued to take out some ore along and above the line of the drift run east through the old stopes on the sill floor of this level; also from the stopes which are being worked both north and south from that drift. Have continued to stoop out ore at the point which is 200 feet south from the north line of the California ground and 44 feet above the sill floor of this level, and the ore there continues to be of good quality. 1650 level: The usual quantity of ore has been extracted from the various openings of this level; also some ore in working out from the winze No. 2, 35 feet above the sill floor of the 1750 level. Have extracted from all parts of the mine during the week 1537 tons of ore which was shipped to the Eureka mill. The average assay value of all the ore worked at that mill during the week (1520 tons) was \$31.90 per ton. Bullion shipped to Carson mint, assay value, \$28,771.06.

OPHIR.—The east crosscut started from near the end of the drift run north from the drift run west from the winze, 122 feet below the sill floor of the 1300 level, has been extended 21 feet; total length, 56 feet; continuing in a porphyry formation, which shows low assay value.

UNION CON.—East crosscut No. 2 on the 1465 level, started from the north lateral drift at a point 200 feet south from the south boundary line of the mine, has been extended 31 feet; total length 721 feet, continuing in a soft porphyry formation showing clay separations.

MEXICAN.—The east crosscut No. 1 started from the main north lateral drift at a point opposite the west crosscut No. 1, has been extended 25 feet; total length 565 feet; in a harder porphyry formation.

GOULD & CURRY.—800 level: Have extracted from old stopes during the week 60 cars of ore of fair quality. Winze No. 1 has been sunk 10 feet through quartz and porphyry; total, 25 feet.

BEST & BELCHER.—800 level: West crosscut No. 1 has been extended 12 feet; total 184 feet; face in hard quartz. East crosscut No. 1 has been extended 20 feet through porphyry, clay and stringers of quartz; total length, 52 feet.

ANDES.—The east drift from the main north drift on the 420 level was advanced 24 feet, connecting with the winze from the 350 level. Have been cutting a drain in the main north drift. The east crosscut from the south drift on the 420 level was advanced 20 feet. No material change in the formation.

YELLOW JACKET.—Shipping 40 tons of ore daily, the battery assays of which average \$18 a ton. Doing some prospecting work in the mine.

JUSTICE.—The north drift on the 822 level was advanced 28 feet since last report and is now out a total distance of 443 feet. The face is in a mixture of clay and porphyry with stringers of quartz through it.

CHALLENGE AND CONFIDENCE.—The joint Confidence and Challenge west crosscut from the north drift on the 300 level is out 25 feet. The face shows quartz having no value. The joint raise from the 750 level is up 190 feet. The top shows quartz having no value.

CON. IMPERIAL.—Work is still being confined to following up and taking out small streaks of ore on the upper levels and overhauling the old stopes.

KENTUCK CON.—Have advanced the raise in the east ledge on the 100 level 8 feet and connected with the 950 level. Have been engaged in timbering the east crosscut from the end of the north lateral drift, and have also saved a small amount of pay ore.

CROWN POINT.—Have started a south drift on the 300 level, which is now out 21 feet. The face is in clay, with streaks of quartz through it. The west crosscut on the 500 level is out 164 feet. The face is in porphyry, clay and quartz. Have stopped work in the 1300 station.

BELCHER.—The south drift from No. 3 east crosscut, 200 level, has been advanced 33 feet; face in a mixture of porphyry and quartz. No. 3 west crosscut, 300 level, has been advanced 33 feet. The face is in porphyry, clay and low-grade quartz. Have stopped the work on the 1400 east crosscut, and are now engaged in cleaning on the 1500 drift.

SEG. BELCHER.—On the 600 level the east cross-

cut from the south lateral drift has been advanced 31 feet since last report, and is now out a total of 176 feet. The face is in clay and porphyry.

HALE & NORCROSS.—On the 1100 level 30 feet back from the face of the east crosscut on our north boundary we have started north and south prospecting drifts following the same low-grade ore that the east crosscut passed through. On the 1400 level the main north lateral drift from the station was advanced a total distance of 275 feet, at which point it connected with the south drift from the bottom of the Savage 1300 level winze. The main south drift on this level has reached our south boundary, and we have started east and west crosscuts therefrom jointly with the Chollar. No. 4 west crosscut near our south boundary on this level was advanced 30 feet; total, 90. This crosscut continues in quartz carrying bunches of ore.

SAVAGE.—Milled the past week 530 tons of ore worth \$17.50 a ton as per battery assays. The north upraise, 300 level, is advanced 31 feet and continues in low-grade ore. From the east crosscut, 900 level, we are stopping ore of fair quality, and are also stopping ore from the east crosscut, 800 level, near our north boundary.

CHOLLAR.—Winze 80 feet south of north line 750 level, is down 112 feet; the bottom is in porphyry. The west crosscut on the north line, 1400 level, is out 30 feet; face in quartz showing low assays. Extracted and sent to the mill the past week 535 tons of ore worth \$15.90 a ton as per battery assays.

POTOSI.—On the 930 level the east crosscut from the winze is out 222 feet; face in porphyry. The winze is down 124 feet below the 1300 level; the bottom is in porphyry with streaks of quartz. The east crosscut from winze, 1300 level, is out from footwall 119 feet; face in porphyry.

ALPHA.—The winze 80 feet north of shaft, 500 level, is down 44 feet; the bottom is in quartz yielding low assays. The north drift from the east crosscut, 180 feet east of shaft, 600 level, is out 46 feet; face in quartz yielding low assays.

UTAH.—On the 725 level the northwest lateral drift for 150 feet from the northwest crosscut No. 2 west crosscut No. 3 advanced 45 feet; face in porphyry and clay. In main west drift, at a point 140 feet from the shaft station have started a drift running in a southerly course to prospect the ground. Face shows quartz assaying low in the precious metals.

OCCIDENTAL.—The stopes on the 400 level are yielding some high grade ore. The south drift from No. 3 upraise below the 400 level is in 50 feet; and is showing fair-grade ore. The south drift from the north line, 650 level, is in 135 feet, and is still in low-grade quartz. The north drift from the winze on the 650 level is in 227 feet and is showing low-grade ore.

Columbus District.

A BRIGHT OUTLOOK.—Inyo Independent, March 20: Candelaria still continues to be a thrifty mining camp. The monthly pay-roll amounts to \$60,000. There is sufficient ore in sight in the Mt. Diablo to supply the milling capacity for a long time. There is a large force of men constantly employed at the Holmes. An English Co. erected a leaching plant last fall and is working the old dumps so profitably that it is expected the work will be considerably increased this spring. A new pipe line will also be laid, the present line being inadequate to supply the demand. The water is carried a distance of 28 miles. Captain Channell, Supt. of the Princess, states that his company is prospecting and opening up new ground but not taking out any ore at present. The future of the Candelaria is very bright, a fact of much interest to the people of this valley, as most of our produce can be marketed there.

Taylor District.

MONITOR.—White Pine News, March 21: Wm. Reed, Supt. of the Monitor mine in Taylor, was in town Thursday after men to fill positions in the Monitor mill which will be started up on the 1st of April.

Highland District.

MENDHA.—Pioche Record, March 19: The Mendha mine at Highland continues steadily to improve, ore being constantly found in the most unexpected places, leading to the belief that it is more than a chimney and that a well defined ledge will be found. The new working shaft is now down some 380 feet, and 20 feet more will tap the lower workings and ore chambers.

Pioche District.

FURNACE TALK.—Pioche Record, March 19: The furnace ran down last Friday, the coal on hand being entirely consumed, and it is considered as doubtful if it is ever run again on its present site. Everything around it is being cleaned up. It is reported now that work on the new furnace site north of town will soon begin, to which the present stack will be removed and a second one added. This was the plan proposed last December, and which the eastern management have since had under consideration. If work is begun at once and pushed, it will be three or four months before the new furnace will be ready to start, but with two stacks in successful operation, we will have a lively town whether the railroad builds in or not.

DAY.—Since reporting on the Day mine several weeks ago, development work there has been steadily pushed and with good results. The strike made in December last, and known as the rich body, is now opened up 135 feet in length and 120 feet in height, with no limits encountered yet. The upper south face of the body assays 330 ounces in silver to the ton, and the lower north face 40 ounces. In the new tunnel the low grade material found several weeks ago has gradually improved, and on Tuesday morning it opened up into a six foot face of ore, going 80 ounces in silver to the ton. The ore is apparently the same character as that of the December strike. The new tunnel was run in the hope of tapping at a different point the December strike, which the management think they have now done, and as the two points are 600 feet apart, the tunnel strike is regarded as of great importance. The new air compressor at the Day is about completed. Three new machine drills are on the ground, and it is expected they will be in operation within ten days. Wood and other supplies are on hand in large quantities, and work on the mine will be vigorously pushed.

ONONDAGO.—At the Onondago, adjoining, the main shaft has now attained a depth of 500 feet, where a drift fur the ledge is now in 20 feet, encountering stringers of ore. It is expected the ledge will be reached in a few days, and that it will

show up as well as in the drifts above. A force of from 28 to 30 men is employed at these two mines.

Tuscarora District.

NAVAJO.—Times-Review, March 20: Stopes on the 350-foot level are looking well and are producing some high-grade ore.

NEVADA QUEEN.—North drift on 650-foot level has been extended 25 feet; total, 174 feet. No change in the formation.

BELLE ISLE.—The 350 stopes are without material change. Nine cars of first-class ore and 32 cars of concentrating ore have been extracted. West crosscut from north gangway, 450-foot level, extended 11 feet; the rock in the face is very hard, showing some spar seams with a slight flow of water.

COMMONWEALTH.—Fourth level—West crosscut has been advanced 7 feet in vein matter giving low assays. East crosscut extended 21 feet. Better assays are obtained as the crosscut is advanced; last 5 feet average assay, \$36.90 per ton. Have started a drift north in the ore; will start south drift as soon as north drift is in far enough not to interfere.

NORTH COMMONWEALTH.—First level—Produced 17 tons first class, average \$242 per ton, and 43 carloads second class, average \$24 per ton. Second level—North drift from west crosscut extended 14 feet in low-grade ore with bunches of high-grade mixed through.

NORTH BELLE ISLE.—North drift from Belle Isle 450-foot level extended 18 feet. The quartz has begun to show spots of ruby silver. The 500 stopes are not looking as well as at last report. Nineteen cars of first-class ore and 89 cars of concentrating ore were broken. No. 4 upraise from the 600-foot level has been extended 9 feet and connected with the 500. An intermediate level has been started from the raise, to open up the ore below the 500-foot level.

ARIZONA.

PLACER MINERS.—Journal-Miner, March 21: Placer miners are at work along all the streams and gulches where gold can be found and are meeting with good success. The Dosoris group of mines, three in number—the Dosoris, Buzzard and Raven—have been bonded for \$30,000. They have each produced large quantities of high-grade ore. C. M. Clark, of the Alice Mining Co., is getting his machinery in position at the Silver Belt mine, and expects to start his engine up soon, taking water out of the mine. The dam of the Humboldt hydraulic works, of which D. E. Keating is superintendent, withstood the recent floods without a break.

CINNABAR.—The McNary cinnabar mines, in Copper Basin, are very promising properties, as far as they are opened up. Assays as high as 80 per cent in quicksilver have been obtained from them, while the general average of the assays are higher than the ore which is being successfully worked in California. Should the ore continue equal in quantity and quality as depth is obtained in the properties, they give promise of becoming one of the greatest quicksilver producers in the country. As the Journal-Miner has no personal interest in the properties, it would be sorry to see them disposed of to any but experienced mining men. It will require the expenditure of considerable money to develop the properties and build a plant for the reduction of the ore. The members of ordinary mining companies, that are new in the business, expect to see their claims pay large dividends as soon as \$2000 or \$3000 have been expended. The men who have had experience in mining know by such experience the fallacy of such expectations. They know that it costs money to delve into the earth in search of hidden treasure. They know that machinery for the treatment of ores is very expensive. The experienced mining man is willing to spend money so long as inducements in the shape of good ore are in sight. The other man wants to see the ore converted into money and the money returned to his pocket at once.

COLORADO.

THE LIXIVIATION PLANT.—Aspen Times, March 20: L. G. Hunt, of Leadville, who has charge of the initiatory steps toward the construction of the lixiviation works in this city, has arrived upon the ground and is gathering a force of men to start operations with energy at once. He says that everything has been waiting upon the plans, but they are now completed, and will be no further hindrance in the prosecution of the enterprise. The plans contemplate the erection of a large plant, complete in every detail. There is now already cut and awaiting the workmen 500,000 feet of lumber. With the material in readiness for the flume and buildings it is expected that very rapid progress will be made in pushing operations forward.

CARBONDALE DISCOVERY.—A report of interesting developments at Silver Crown mine on Avalanche creek has been brought to the city by N. C. Scheu of Carbonade. The company has run a tunnel to the distance of 600 feet which passed a four-inch vein of ore. Last week a drift was started in this vein to develop its size and extent. After going only six feet the vein widened to a thickness of from 28 to 24 inches, the greater proportion of which resembles the Bushwacker ore, and would be easily mistaken for that. An assay of samples taken from a narrow streak of the vein is said to have run as high as 1300 ounces.

BRITISH COLUMBIA.

TO BE STARTED UP.—Nelson Miner, March 21: The Kootenay Lake country has within its limits what is believed to be one of the largest lead mines in the world—Hendryx's Blue Bell—as well as one of the richest silver-copper mining propositions in America—Halls' Silver King. The ore from the mines in Hot Springs district are not only rich in native silver, but their average value is above that of any galena camp in the United States. The gold claims near Nelson are not mere prospects, as one of them—Davenport's Poorman—already takes high rank as a bullion producer. Owing to a scarcity of water the 10 stamps in the mill on the last named property were hung up during the winter. The mill, however, will be started up again as soon as there is enough water in Eagle creek to run it, word to that effect being received by the last mail. Between 20 and 30 men will be put at work in the mine.

COPPER PYRITES.—Last June the Queen Victoria, a copper claim situated about 7½ miles west of

Nelson, was bonded to parties said to be officials of the Canadian Pacific road. The amount of the bond was \$50,000. For some reason, the bond was not taken up. This discouraged the owners, and little work was done on the property until late this winter, when Charles Brown, one of the owners, resumed work in the tunnel that was started to prove the width of the ledge. As the tunnel was advanced the ore became less mixed with waste rock, and it is now believed to be in place. Its grade has also improved, and it is said to be fully equal to that of the Anaconda mine at Butte, Montana. It is copper pyrites, the percentage of copper not being large. The immensity of the croppings and the facility with which mining operations can be carried on, to say nothing of the nearness of the railway track, gives the property a value that can only be increased by the employment of capital.

PROSPECTS NEVER BRIGHTER.—Reports from Hot Springs district are that development work is proving the claims and mines of that section to be wonders. The shaft of the United is down 100 feet and in solid ore. The Tenderfoot shaft is down 60 feet, with good ore in its bottom. The drift in the No. 1 is in high-grade carbonate ore. Altogether, the prospects of the camp were never brighter.

IDAHO.

TRADE DOLLAR.—Idaho Avalanche, March 21: The lower drift on the Trade Dollar lode is still being pushed north to the winze sunk from the upper level. About 200 feet still remains to be run, which is being run by contract. The vein at the present face is 12 feet wide, of fine quartz and the walls are smooth and regular. The quartz runs about \$20. When this drift is completed to the winze an immense body of ore will be exposed which will be in fine shape for being cheaply mined. By the time the roads are open the mine will be in shape to keep a big mill running. Work on the face of the upper level has been suspended for want of timbers, but stoping is being done north from the winze toward the face of the drift. The rock taken out is the richest which has ever been found in the mine. The vein is two and a half feet wide, rich rock, with two streaks in it extremely rich. As soon as timbers can be obtained the level will be continued north.

LOWER CALIFORNIA.

ALAMO.—Lower Californian, March 19: You can get an idea of what's going on in the camp by reading this letter. Drifting is continued on the 150-foot level of the Ulises, following the vein discovered a few weeks ago. The Gold Tree is furnishing rich rock yet to the Princess mill. The Indio is still sinking. The San David is being developed. A stringer of the Montezuma was discovered last week which contained very rich rock. The ground was leased to a party of contractors who will develop it. The Montezuma proper will be re-opened by Albright and Howard. The Aurora is working night and day as usual in good ore. The El Paso is down 85 feet and drifting has commenced on the 25-foot level. The mill will be started soon. The Candelaria mine has been re-denounced under the title of Abandonment and will be re-opened, as also the Blanket Ledge between Alamo and Mexican gulch. The Scorpion mine and mill will be running soon.

NEW MEXICO.

ALHAMBRA.—Silver City Enterprise, March 20: John Dodd, brother of Superintendent Dodd, of Alhambra, and Charles Campbell, made a discovery at that camp recently which may prove a formidable rival for the honor of first place in the mines of that camp. The ore is a sulphide and native silver and closely resembles in appearance the high-grade ores from the surface of the big ore chutes on the Alhambra and Black Hawk mines. Uncle Ben Hobson will soon make another shipment of high-grade ore from Hobson No. 2.

MONTANA.

THE HECLA CON.—Mining Journal, March 21: The annual report of the Hecla Con., operating in Beaverhead county, has just been issued. It shows that the total dividends paid by this company from 1881 to 1891 aggregate \$1,560,000, while the total amount of wages paid to miners during the same period was \$1,480,636.66. The gross disbursements for the decade amounted to \$5,073,499.60. Up to date the total amount of ore mined by this company has been 241,161 tons. The cost of mining the ore was \$20.27 per ton during 1890, which is a large increase. This is accounted for by the constantly increased depth of the mine, increased cost of dead-work, retimbering and costs of machinery. The result of the year's work was a total production of \$627,087.57; total expenditure, \$454,369.27, leaving a net profit for the year of \$172,718.30.

MR. DALY TO RESIGN.—Butte Miner, March 19: The vacancy at the Anaconda recently made by the death of Supt. Michael Carroll has not yet been filled and, from what can be learned, is not likely to be until some little business in which the company is interested is settled up. In the meantime work is progressing as usual under the efficient direction of Joseph Laird, superintendent of the Mountain Con., and Paddy Kane, who has long held the position of shift boss at the Anaconda. It is rumored that in the near future Mr. Daly will resign as general manager of the mines and smelters, his health not warranting him in attending to the arduous duties of the position, and that Mr. Carroll's successor will not be named until after a new general manager assumes control.

COMING TO THE FRONT.—The Receiver claim, located southeast of the Clinton company's ground in Horse canyon, is now coming to the front as a producer. Seven feet of ore that will average 275 ounces in silver per ton and a small per cent in copper has just been struck at a depth of 145 feet. So far about 20 tons of this ore have been raised in the surface and the work is still being prosecuted with a crew of six men. The property is under lease and held to E. F. Kinney.

THE NONPAREIL MINE.—The Deer Lodge Mining and Reduction Co. is prosecuting work vigorously with 21 men on its Nonpareil location at Boulder creek. As is well known, this vein is 133 feet wide between walls and is filled with vein matter containing considerable ore. A shaft has been sunk on it 270 feet, where levels are now being run east and west. This development is with a view to un-

covering one of the several strata of ore which are found in the vein, and is very encouraging. On the 140-foot level the drift is being pushed on a stratum of three feet of ore that assays 29½ ounces of silver and 38½ per cent lead. The company will this week begin to ship ore from this working to St. Louis.

OREGON.

WATER SUPPLY.—Jacksonville Times, March 21: There is still a good supply of water and the miners are making the most of it. There is plenty of water at Ennis & Cameron's mine at Galice creek and three giants are busily employed there. A. W. Sturgis of Forest creek made another cleanup last week which netted him many hundred dollars in gold dust. J. T. Breeden of Applegate, who purchased Klesslin Bros.' interests, is now engaged in putting up the large wheel which will furnish power. John Henry has sold his interest in the quartz ledge on Applegate to his partner, S. Messenger. It promises well, several good cleanups having been made by means of an arastra. The Cinnabar mine, operated by J. B. McGee, is being rapidly put in shape for handling the output, a ditch being in course of construction for sluicing and the iron on the ground for the works.

SANTIAM MINES.—Jefferson Review, March 21: The Santiam mines are attracting great attention in Portland. They are destined to become the center of mining operations in the northwest, in fact on the coast, and everything conduces to this end. The rich find in the Bonanza mine is not the only thing that points that way. The ore that has been taken out generally has been of a paying nature. The Albany Co. will push their mine as soon as the snow is off, and it is probable several other companies will put in mills. There are millions there.

UTAH.

SILVER MOON.—Salt Lake Stock Exchange Journal, March 21: A letter from the superintendent of the Tintic M. and M. Co. property, near Silver City, states that the shaft on the Silver Moon is being sunk as rapidly as two shifts of men can work. The shaft is now in good ore, but it is expected that inside of 10 days a big ore body will be exposed, when shipping will begin. A number of shipments have already been made. It is the intention of the company to list the property with the Exchange.

DALY.—Park Record, March 21: Dividend No. 49 of the Daly amounting to \$37,500 was declared yesterday, and is payable in New York, San Francisco and Salt Lake. Total amount of dividends to date \$1,790,500. Sinking was begun on the Crescent shaft this week, and the work will be crowded as fast as possible. No difficulty is experienced in holding the water in check and connection with the Hanauer tunnel is expected to be made without any serious trouble. T. J. Almy came out from the city this week and paid off the employees at the Ontario and Daly mines and mills, and at the tunnel. The needful—to the amount of about \$80,000 is now floating among the business men.

PIONEER RIDGE.—The prospects for active development on the Pioneer Ridge next summer is already having its effect on the future welfare of the camp, and negotiations are now pending for two valuable properties which, if consummated, will be the means of bringing many thousands of dollars to the camp for investment. The winze on the West end is down some 43 feet, and the ore body is gradually growing larger. There is now more than six feet of ore.

PROSPECTIVE.—There is much talk among prospectors of a busy summer, and the outlook at present indicates that more thorough development work will be done than ever before. Every man who owns a prospective mine realizes that he must put it in saleable shape as soon as possible, if he would realize on it. That is the right idea, for very few men will purchase ground that has no developed indications of a mine. Surface croppings and locations go a long way but something tangible must be in sight or it is hard work to make a sale.

WASHINGTON.

COAL AND IRON.—Ellensburg Capital, March 20: Seaton Bros.' Gold Leaf mine is under bond to Seattle parties. The Swauk placer mines will be worked with good result this season and a large amount of gold will be taken out. Water promises to be abundant, and the miners are prepared to make good use of it. New capital having gone into Peshastan district, a large amount of work will be done there this season, and there are some prospects of a new stamp mill being built there. The iron mines south of Ellensburg are opening up well, and the ore, which is very superior, is improving in quality. This ore, combined with the Uncle Sam, makes pig iron that can't be surpassed in the United States. The same quality of coal found in the Canada mine north of Ellensburg, is said to embody the city. This was the opinion of Prof. Clayton, one of the best mining experts and geologists in the country when he was living, and his views have since been confirmed by W. H. Hampton, who succeeded him at Portland. This coal is excellent for coking, and will play an important part in the reduction of iron ore in Kittitas county. Kittitas county, of which Ellensburg is the great heart and center, can show more minerals than any county in the State of Washington. It has gold, silver, copper, lead, iron, coal, asbestos and aluminum in great abundance and has all the fluxes for the successful reduction of metals.

CONCONULLY.—Okanogan Outlook, March 21: Wheeler & Beckmyer are doing development work on the Montana mine on Mineral hill. The Chilson brothers have bonded the Silver Bluff mine, in the Lime belt, to a Seattle mining Co. for \$50,000. The Ruby Hill Mining Co., recently organized at Spokane, will soon begin development operations on Ruby hill. We are reliably informed that the Fourth of July Co. propose to resume development work on the mine about the 1st of April. There is a movement on foot among some of the leading citizens of Conconully to organize a company for the purpose of building and operating a 10-stamp quartz mill. Dennis McDonald, who is working a force of men on the Red Shirt mine, in the Methow, was in town this week. The main tunnel in the mine is now in over 200 feet, has crosscut two ledges and is expected to tap another, the main vein, in a few days. Mr. McDonald is developing the mine for a Montana syndicate.

MECHANICAL PROGRESS

IRON WORKS IN CHINA.—It appears from a number of the *North China Mail* that the Celestial Empire is soon to be in possession of quite an extensive iron and steel works plant. A site has been chosen on the northern slope of the Hanyang Hills, opposite the native city of Hankow, and thus close to the Yangtze, with which, afterward, the works will be connected. As far as ascertained, the factories will be very important indeed, and will comprise, for the present, two large blast furnaces of the Cleveland, England, type, with all their apparatus, appurtenances, and machinery, capable of producing about 100 tons of pig iron daily. There will be also a complete Bessemer plant, including two 5-ton converters, with their anodes, casting-cranes, large blow-lung-engines, etc. The ingot steel made here will be rolled out into flange rails, so that the specifications include necessarily a large rail mill and all machinery and apparatus for the same. It is known, apart from this, that the manufacture of rails for their future railways has been the chief object of the Chinese in designing these iron and steel works [and also, no doubt, of the delay in the introduction of railways into the country]. A small Siemens-Martin plant will complete the steel work. Its object is the casting of soft steel for ship plates, and special metal for the navy's small arms and gun factory. As for the iron department, it will also be a very complete one, including some 20 puddling furnaces and a plate and bar mill, with all indispensable machinery. It is roughly estimated that the works will cover about 40 acres. They will be intersected by railways on which the astonished Chinese will, perhaps, see half-a-dozen locomotives, small and large, travelling in different directions. The whole plant must be entirely delivered in the first month of next year. An important part of the machinery has already been brought up and landed directly out of two ocean-going steamers.

MOLDING SAND—WHAT IT SHOULD BE.—In a recent number of Ferdinand Kohn's "Iron and Steel Manufacture" is given the following valuable information in regard to molding sand, which will be of value to many readers who have often wondered, no doubt, why castings made in different localities from the same iron should differ so much: "The mold has an important function to perform in the process of casting. It must resist the pressure of the liquid metal in every direction, and at the same time give a free escape to the air and gases generated in the mold while being filled and during solidification. It must give to the casting a clean, smooth surface and allow an easy separation from the sand. It must neither act chemically upon the liquid metal, nor be affected by it at the high temperature at which it is brought in contact with the sand. The higher the temperature of the liquid metal, the more difficult it is to comply with these conditions, and the fewer are the substances which can be used for this purpose. . . . The presence of three per cent metallic oxides in molding sand impairs its refractory qualities. Still more undesirable is the presence of lime, one per cent of which will make sand undesirable for good castings. Lime present as a carbonate gives off its carbonic acid gas at the temperature of liquid iron, causing the latter, when in contact with the mold, to form bubbles and air-passages which destroy the smoothness of the surface. If present as caustic, it will vitrify and adhere to the face of the castings. . . . The heat molding sands are those that contain the largest proportion of silica; from one to three per cent magnesia; an entire absence of lime with sufficient alumina to render the sand cohesive and plastic. Sands of the above description are seldom found in a natural state."

WELDING A SPRING.—A correspondent of the *Blacksmith and Wheelwright*, who seems to have had considerable experience, says: "I see a great many different ways of welding springs and have had some experience of my own. The best method that I have been able to find is the one that I will endeavor to explain for the benefit of my brother blacksmiths. When a broken spring comes into the shop to be welded, I always take its exact length, if it is a main leaf; if not, it doesn't make much difference. I then either take the devil's hitch on it or just a common scarf lap. In the meantime, do not heat above a cherry heat. I then punch one or two holes in the ends, rivet them together with Norway iron rivets, as no other kind is as good for welding steel. This done, I heat it red-hot and then put on my horax and let it melt before I put any coals over the steel. I then take a heat on it and take it out and weld it fastways with the first heat. Never strike it on the edge the first time. I now put it in the fire and take my second heat on the spring, then take it out and hit it three or four times fastways, and finish up the edges. By this method a man will hardly, if ever, hurt a weld open, and if he tries to make his weld at one heat he will fail a great many times; whereas if he would take the second heat, he would be all right. My reason for using Norway iron rivets is, as any person using them once will find, that they will weld to steel better than common iron. I have tried a great many different ways, and I find this the best of them all."

THE BARGAIN RAIL, a California invention appears to be attracting considerable attention

among railroad men at the East. This rail, it is claimed, possesses several advantages over the steel rails in common use. These rails will be laid on the belt railroad line of this city. There is a report that a section of the North Western railroad out of Chicago, will be laid with these rails as a test. Shipping rails for San Francisco to Chicago will seem very much like sending coals to Newcastle; but stranger things have happened and may happen again.

JAPANESE SKILL IN METAL WORKING.—The Japanese are past masters in the treatment of alloys both in texture and in color, and no better guides exist. They achieve their grand results by the simplest means—a judicious blending of various metals, including and picking. Copper is the basis of their chief alloys, and by incorporating with it certain proportions of gold and silver they obtain remarkable results in color through the pickling process. But not only do they get striking effects from their alloys and pickling—their mode of working up the metals is a thing to be studied. For instance, they will take six or seven plates of different metals and alloys, weld them together, and then, by drilling, punching up and filling, get a surface in which all the metals show in a manner which is truly wonderful. By the range of tints at their command they can work out on a metal surface scenes of animal life, landscapes, etc., with effects never dreamed of by metal-workers in the Western world. Among some examples recently shown in England was a knife-handle on which was a representation of a duck dipping its head under the water of a stream on which it was swimming, the arrangement of the different alloys by which it was composed and the pickling being so well arranged that the neck of the duck was seen as under the water, when the handle was held in a certain light. Another example was a sword-hilt on which some minnows not more than one-sixteenth of an inch in length, each having a pair of gold eyes, were swimming upon a gray stream, the effect of their being actually below the surface of the water being suggested with marvelous skill. Imitations of wood, grain and marbles were also shown.—*Jewelers' Weekly*

NEW METHOD OF REDUCING STEEL.—It is now claimed that by a new method, plates for steel vessels may be made as strong and elastic as by the open-hearth process, this result being due, in the former case, to the use of small converters, having a capacity of three or four tons. By the open-hearth process the iron is reduced or melted on a platform, the heat coming from the flame which passes over it, the amount of iron melted varying according to the size of the furnace, generally not exceeding 15 or 20 tons. Metals reduced in this way allow of an examination during the heating process, the molten mass being viewed through a piece of blue glass, it being thus easier to obtain better indications as to the length of time required to secure the most satisfactory product. The new process is but little different from the Bessemer, the only distinction being in regard to the size of the converter, a large vessel being used, on which it swings or turns. In the lower edge is a pipe, through which air is forced at sufficient pressure to prevent the metal, when melted, from flowing into it. The converter is hung at an angle, and as it turns, the air forced up, permeates the mass, reducing the metal at a more rapid rate than by any other process known. It disposes of the objection raised against the Bessemer operation, of the air not going thoroughly through the whole mass, and it is also claimed that the product of this improved process is more even than by the open hearth.—*Eng.*

NEW METHODS FROM SWEDEN.—Herr C. A. Caspersen of Margretskil, Sweden, has recently obtained a patent for testing the hardness of iron or steel while in the process of manufacture. His method is to conduct a current of electricity through a test piece of iron or steel, letting it melt the same, upon which the strength of the current necessitated in the operation is compared with the strength of current required for the fusion of a standard piece of metal of a determined degree of hardness and of the same diameter as the piece tested. The hardest piece will resist longest, but melt if the current be maintained sufficiently long. By the aid of an ampere meter, metals of varying hardness may be tabulated so as to furnish a scale of hardness of any metal treated, through the number of amperes required for its fusion. Johann L. Sihenius, also of Sweden, is the patentee of the new method of casting metals under the influence of centrifugal force, by which the particles of metal are brought into a position radial to the axis of rotation as the metal cools, and by which gas bubbles are also removed and any impurities forced into the circumference or outer skin of the casting.

A SERIES OF EXPERIMENTS, made at the Baltimore Copper Works, in the electric smelting of copper, has resulted so favorably that a company has been formed and large works are to be built on the line of the Baltimore and Ohio road in South Baltimore to use the newly-discovered process. An extensive electric generating plant will be put in. The inventors claim that the new process will materially reduce the cost of refining copper.

LIFE OF A LOCOMOTIVE.—The locomotive engine is said to have a maximum life of about 30 years. The annual cost of repairs is from 10 to 15 per cent of its first cost.

SCIENTIFIC PROGRESS.

The Energy of a Blast Furnace.

Few persons, save those connected with the manufacture of pig iron, are aware of the enormous and insatiable appetite of one of the largest blast furnaces. The figures hitherto given failed to convey an adequate idea of the immense quantity of materials that pass through such a furnace, and it is only when the total daily amount of these materials is considered that the tremendous igneous activities constantly at work in that combination of hurricane and volcano—a modern blast furnace of the first class—can be fully appreciated. Such a furnace will have passed through it in 24 hours the following materials:

	Gross tons.
Ore.....	583
Coke.....	442
Limestone.....	158
Atmospheric air (blast).....	1,041

Total.....2,225
Which is equal to 92 tons per hour, or 1.53 tons per minute. From this quantity of materials there will be produced in 24 hours 784,000 pounds, or 350 gross tons, of pig iron, which is at the rate of 32,666 pounds, or 14.57 tons, per hour, or 544 pounds per minute.

Heating the 25,000 cubic feet of air supplied per minute to a temperature of 1200° Fahr., its volume would be increased to 85,000 cubic feet; and, on the supposition that the furnace is blown by seven tuyeres, each seven inches in diameter, this torrid air would rush through each tuyere (under a pressure of 9 pounds per square inch) at the rate of 12,143 cubic feet, and having the enormous lineal velocity of 45,417 feet per minute. The velocity is over five times that of the most violent tornadoes, and the pressure is more than 25 times greater. Should a blast of equal pressure and velocity come from unfathomed space and envelop this earth, it is absolutely certain that no living beings or loose materials would be left upon its rock-ribbed skeleton, which, stripped of its flesh and blood, fields and forests, lakes and oceans, would be hurled into a new orbit and made to assume revolutions and rotations whose amplitude and duration it is impossible to imagine or describe.—*Popular Science Monthly.*

New Experiments in Magnetism.

It has long been known that a common sewing needle will float if carefully placed on a surface of water; also, that if the needle be magnetized, it will assume a position in the magnetic meridian. Iron and steel filings will also float, and they can be sprinkled upon the liquid surface nearly as well as upon a solid. If the pole of a magnet be brought near the floating particles, they will respond to the solicitations of the magnetic field in a very free and easy manner.

Let a strong U magnet have its poles brought near to the iron filings and they will at once arrange themselves in the well-known forms, the lines being plainly seen. The induction, of course, causes adjacent particles to assume opposite polarities and consequently touch each other when free to move. If, now, the field magnet be removed, the filings will retain their arrangement, and if it be in a vessel large enough to permit the rotation of the whole body, it will swing into the magnetic meridian. If it did not happen to be in it at first, thus showing the arrangement constitutes the magnet, and that, as a whole, it possesses a magnetic field upon which the earth's field can act.

Now bring gently near the floating magnet one pole of a bar magnet. If this be presented to one of the poles of the particles, it will be attracted toward it, and the whole body will rotate more or less, but this must be done slowly, else the arrangement of the filings will be broken up. The opposite pole will, of course, under similar conditions, exhibit repulsive action and the whole will swing about.

If, now, the magnetic pole be brought near to the middle of the arranged filings, some of the groups will be more or less disintegrated from the rest and will rotate upon a vertical axis and quite turn round. The opposite pole presented will cause them to rotate back again. Great numbers of these can be seen to turn thus whenever a pole is thus presented.

This phenomenon is evidently precisely the same in character as that illustrated at length by Ewing in his late investigations into the constitution of the magnets, wherein he used small magnetic needles mounted upon pivots. The above experiments can be tried in a saucer of water, but the whole is capable of being projected with the vertical attached to a lantern and the movements of all sorts seen upon a screen with ease and very little painstaking.—*Electrical Engineer.*

THE GULF STREAM AND CYCLONES.—Among the many theories which were given to us as fixed facts, and stored away as such in our memories during our schoolboy days, but which are being swept away one by one by later investigations, we shall probably have to class that which professed to describe so accurately the course and influence of the Gulf stream. The time-honored teaching of the old geographers that the full force of the current, after entering and making a complete circuit of the Gulf of Mexico, made its way northward through the cooler waters of the Western At-

lantic, and even affected the temperature of Europe, has been materially modified by the more careful observations of modern science. The view that is now favored, if not fully established by recent observers, is that the Gulf Stream as a current really begins at Florida strait and ends somewhere near the Grand Banks. The fact that the drift from the stream is found largely in the western part of the North Atlantic is explained by the influence of the prevailing winds, but Lieut. Pillsbury is thought to have shown that high winds do not interfere with either the velocity, position or direction of the stream itself. Patches of the stream drift have been found during the last few years closely packed along the eastern shores of the Middle and North Atlantic States. This has led some to fear that the Gulf Stream was shifting its position to one nearer the coast and that a gradual change of climate was the result. But Mr. Jacques W. Redway points out in a recent article that there has been a systematic and periodic change in certain of the elements of the stream ever since it had an existence; and he argues that the assumption that in a very long period of time the precession of the equinoxes may affect the position and direction of the line of maximum flow is a question of theory and not of fact. Mr. Redway admits that there is a remarkable correspondence between the track of this current and the cyclones of the North Atlantic, but asserts that positive proof of any connection between the two phenomena is lacking. The records of the Weather Bureau of the United States show that during the summer months, when the current of the Gulf Stream is putting forth its greatest strength, the cyclones come most frequently, and it is thought possible that the excess of moisture which hovers along the track of the stream may be the fuel to which the cyclones owe their energy.—*Toronto Work.*

ABSORPTION OF ORGANIC MATTER BY PLANTS.

In a communication by Prof. Calderon of the Institute of Las Palmas, Canary Isles, he contests the ordinary view that the nitrogen of the tissues of plants is derived entirely from the nitrates and ammoniacal salts absorbed through the roots. He does not, however, adopt the old theory that the source is the free nitrogen of the atmosphere, but rather the nitrogenous organic matter which is always floating in the air. The nutrition of plants he divides into three classes: *Necrophagous*, the absorption of dead organic matter in various stages of decomposition; *plasmophagous*, the assimilation of living organic matter without elimination, or destruction of any kind between useful and useless substances, such as the nutrition of parasites; and *biophagous*, the absorption of living organisms, such as that known in the case of insectivorous plants. A further illustration of the latter kind of nutrition is, according to Prof. Calderon, furnished by all plants furnished with viscid hairs or a glutinous excretion, the object of which is the detention and destruction of small insects. To prove the importance of the nitrogenous substances floating in the air to the life of plants, he deprived all of organic matter in the mode described by Prof. Tyndall, and subjected lichens to the access only of this filtered air and distilled water, when he found all their physiological functions to be suddenly suspended.—*Nature.*

A NEW COAL SAVING COMPOSITION.—A coal-saving composition which has been invented by Mr. W. C. Owston, of the Pontefract Coal-Saving Company, Limited, was tried last week, in Leeds. The composition is a chemical compound resembling fine sand, and one of the principal properties claimed for it is that when sprinkled on an ordinary fire, after it has been made up, it ensures thorough combustion, all the gas and tar, which in the ordinary way is allowed to pass off in smoke up the chimney, being consumed. It is also claimed that a fire so treated lasts longer, and throws out more heat. The mode of operand is very simple, all that is required to be done being to sprinkle about ½ ounce of the composition over the fire.—*Colliery Guardian.*

FREE TELEPHONES will soon be a possibility. In England the Bell Telephone patent has expired, and the Edison patents will soon expire, and there will then be free competition in that line of business, resulting in a greatly reduced rate for instruments. The long-suffering business public of the United States will be thankful when the 17 years life of the patent in this country expires, and that soulless monopoly is brought into competition with any manufacturers who may see fit to enter the field.

A COLD WAVE.—Prof. T. Russell defines a "cold wave" as a fall of 20 degrees in temperature in 24 hours over an area of 50,000 square miles, the temperature in some part of this area descending to 36°. During the past ten years there have been no less than 691 cold waves in the United States.

A BURNING TAPER uncovered for a single instant, during which it does not lose power amounting to the one-thousandth of a grain, would fill with light a sphere four miles in diameter so as to be visible from every part of the compass.

ALPINE GLACIERS.—A recent survey has established the number of glaciers in the Alps at 1255, of which 249 have a length of more than 4½ miles. The French Alps contain 144 glaciers, those of Italy 78, Switzerland 471 and Austria 462.

GOOD HEALTH.

La Grippe Epidemic.

La grippe, according to the report of the State Board of Health for February, is again upon us, and rapidly developing into a widespread epidemic, quite equal to that which prevailed during the winter of 1889-90. The present epidemic is characterized by its sudden onset and the intensity of its initiatory symptoms, the premonitory chill, the fever, headache, backache, pains in the bones and muscles, that more nearly resemble dengue, or haekhoe fever, than any other disease. Another feature peculiar to the present epidemic is the frequency with which cases occur in which the cough is almost entirely absent, and others in which pneumonia of a low type is almost certain to be developed. The debility accompanying the disease is invariably present and must be treated by stimulants liberally given. The origin of the disease being unknown, the power of the sanitarian over it is exceedingly limited, and consists chiefly in advising the avoidance of all depressing influences that might deteriorate the healthy constitution, or impair its strength.

In many cases it is accompanied by slight pneumonia or pleuro-pneumonia, which in feeble constitutions may assume a severe type. This may account for the unusual mortality from pneumonia during the month of February—160 deaths being counted in a population of 721,975.

La Grippe is a febrile disorder, and it usually ends with a slow convalescence. Its mortality when not attended or immediately followed by pneumonia, is generally small—not over two or three per cent of the cases. It is generally accompanied by loss of strength and depression of spirits. It appears to travel like cholera from east to west.

The Origin of La Grippe.

It is supposed to be occasioned by the presence in the atmosphere of a specific organism which enters the body in the air that is breathed, and rapidly multiplies until the food on which it lives is exhausted, when it perishes and disappears. Hence it is admitted to be both contagious and infectious. If this theory of its origin be sound, it follows that little good can be done by medicines, though they may mitigate some of the more annoying symptoms. The high priests of bacteriology are studying to discover some means of destroying this supposed yet undiscovered bacillus.

There does not appear to be much connection between la grippe and a common cold, except that the occurrence of a cold may so weaken the system as to make it more susceptible to the attack of la grippe bacillus. Hence care should be taken to avoid exposure. There is no need for especial alarm, but people, especially the aged and feeble, should be upon their guard against possibilities.

The Treatment of the Disease.

The symptoms of the approach of the disease are given above. We clip from a contemporary the following rules for treatment which will generally be found to apply to all cases. The first is to stop the chill with which the attack usually begins, and this should be done with hot bottles, and in obstinate cases with the use of a hot brick steeped in alcohol. At all costs, the temperature of the patients must be restored. This accomplished, the loss of strength caused by the disease should be met by a generous use of digestible and nutritious food. Physicians generally supplement this treatment by prescribing a number of drugs which may be of service or may not. The chances are that they will do no harm. The patient should remain indoors, in a room that is free from draughts and suitably warmed. He should, so far as he can, keep up his spirits by cheerful reading and conversation.

It was found last year that people who had had the grippe were left in a crippled condition when it disappeared. They remained for weeks feeble and liable to catch other diseases; they suffered terribly from depression of mind, and the nervous system remained out of order for quite awhile. These consequences of the malady are characteristic, and it is not easy to see how they can be prevented. Physicians have not succeeded as yet in discovering an antidote for nervous depression, and la grippe takes on that shape in the stage of convalescence. It leaves "the blues" behind it, and it is beyond the reach of modern art to dispel them.

The spread of this disease might no doubt be materially lessened if the public could be taught to look upon it as it does upon diphtheria and small-pox, and take the same precautions in isolating its victims as it does in cases of those diseases. A contemporary makes a good point, applicable to all contagious diseases, as follows: Another point upon which it might be well to inform the public is, that where an infectious or contagious disease occurs in a home and the washing of the patient's bedding or clothing is sent away to be washed without first having them thoroughly disinfected and the washerwoman or any of her family thereby become infected, they can recover damages in a court of law if not previously notified or warned that the clothing is infected. A few successful suits of this kind would engender caution and a realization of the fact that public protection must be afforded against infectious disease.

THE BUILDER.

The Sins of Architects.

A writer in *Popular Science Monthly* for December criticises some of our architects as follows: "In the search for the beautiful in architecture the demand for impressive facades, the taste for complicated ornament, and a most singular appreciation of the odd, the grotesque and the ugly, there is little attention paid to matters which seem self-evident and are of really vital importance. Windows are arranged to suit a symmetrical facade, whether they are just what are needed for the rooms or not, and even where it is possible little attention is given to the direction of sunlight in order that the living-rooms may receive the full benefit of the natural warmth, nor are those rooms where it is not needed or minor offices relegated to the exposed side. The most important external feature, the door, is seldom adjusted to the climate. Even in large offices buildings, hotels and churches, where there should be ample space for every structural convenience, the door is frequently of cramped dimensions, and instead of being preceded by a porch, which would be an integral part of the architecture, and which is absolutely essential in our long, cold, damp winters, is boarded up with "storm doors" that are not only hideous in design but an actual obstruction. With the rapid increase in the value of land which has taken place in all our large cities in late years, a wild fear lest any inch be wasted has resulted in a compactness of plan that is frequently painful. The housekeeper longs for the roomy closets and ample store-rooms of the old buildings; the fine hall that once formed an imposing and appropriate entrance, has given place to the narrow entry through which it is frequently impossible to carry the larger articles of furniture. The same difficulty is experienced in the sharp, frequent turns which characterize so many stairways. Bedrooms are pushed into corners where they seldom have the benefit of pure, free air and the heat of the sun, for no other reason than that space is required for ample reception-rooms and state apartments, which, though used comparatively seldom, are treated as the most important part of the house."

ABOUT FLOORS.—Why one finds so few good floors when architects never fail to make the proper specifications to obtain such, says the *Northwestern Builder*, is somewhat of a mystery to every one who suffers from bad floors, and this every one includes the man or woman who sweeps the floors, those who suffer from the dirt and dust they harbor, and especially those who carry off slivers in the soles of their shoes. Negligence is the principal reason for this state of facts, and both architect and carpenter are open to the charge. As perhaps three-fourths of all floors laid are of yellow pine, a material that gives better satisfaction than even the higher-priced hard woods, and as every architect and every carpenter knows how to obtain an almost perfect floor with this material, where does the negligence manifest itself? In the selection or acceptance of the material. Every board should have a straight or "comb" grain, and if the log is properly sawed, every board will have such a grain, just as quarter-sawing produces a grain of peculiar kind and beauty, but very few millers care to take the trouble to saw in this manner, and they will not as long as they can sell any kind of stuff for high-grade flooring. Floors to be carpeted are usually made of white pine, and to save a little labor they are usually nailed through instead of being nailed through the tongue. Some of the nails are almost certain to work up and a hole in the carpet is the result. Such things may seem to be small matters, but a multitude of them creep into a building and its occupants can never know the comforts of a well-built house.

WINDOWS, and their necessary adjuncts, are at the present time a matter of consideration for architects when formulating plans for future buildings. The old device of weights and cords has become so firmly established by usage that by superior merit only can any other appliance be substituted therefor. The Gardner sash balance seems to possess all the especial advantages of the weight and pulley system, but the defect of cords is overcome by the use of a steel tape in place of such cords. These tapes are galvanized, so as to prevent them from rusting and are provided with convenient attachments to both sash and weights. They hold the sash in any position, and when raised the upper sash is held in its place so that the lock will catch. Where a twisted or braided cord is used, the sash will drop a quarter or a half-inch—or just sufficient to prevent the sash-lock from taking effect.—*Ex.*

ROOF AND CHIMNEY.—There is no doubt but the form of a roof has much to do with the draught of a chimney. The flat roof offers no resistance to the passage of air, but as the pitch is increased, the current is more and more disturbed, until with a high-pitched and many-gabled roof it is broken into innumerable eddies, some of which are sure to curl down and force the smoke and gases in the flue into the rooms below. Chimneys on such roofs should be built higher than ordinarily.

USEFUL INFORMATION.

SOAPSTONE.—The term "earth-eaters" is applied to savages on the banks of the Orinoco and in New Caledonia, who eat a kind of steatite of a soft nature. Soft steatite forms excellent stoppers for the chemical apparatus used in distilling or subliming corrosive vapors. The powder is used also to diminish friction. Venetian talc is used for removing stains from woollen cloth. The fine varietles of talc when colored with the safflower forms a rouge for the toilet. In later years the mineral has been applied to many domestic uses. The old-fashioned wooden washtubs have almost disappeared from New York flat houses and dwellings. In place thereof is put in stationary washtubs built of soapstone with the usual faucets and traps. Through their use is saved much labor for domestics and tired mothers of families. The borders of registers and the slabs of fireplaces and under ranges are made of soapstone too. Laundries are putting in stationary wash-tubs. The use of soapstone for washtubs is a sanitary measure. The mineral does not absorb as in the case of wood. An ordinary iron tub will absorb grease. In cases of contagious diseases like scarlet fever, soapstone cannot absorb the germs in the filthy water left in washing garments worn by sick people. The old-fashioned tubs did absorb the germs. They might be dormant for a time, but there was danger that the germ might spring into life again. Among the articles which can be made from soapstone are bath tubs, fireplace lining, stove lining, griddles, foot-warmers, muff-stones, acid tanks, table tops, molding for organ pipes, sinks and pots for water lilies. It is used for wallscotting and for non-conductors on electric motors. In New Orleans and other southern cities it is used in the manufacture of coffins.

SHORT WEIGHT GOLD COIN BECOMING COMMON.—Short-weight gold coins are becoming annoyingly common in the Eastern States. This "shortness" is due to a species of robbery familiarly known as "sweating coins." From a careful examination of light pieces which are now being found, it is evident that the thief is not doing his work by the old hand method of shaking the coins in a bag and then gathering the dust by means of quicksilver, but that he has brought into requisition the agency of electricity. The service of an ordinary galvanic battery and some cheap acid is all that is necessary to conduct the operation by the electric process. The scheme is similar to that employed in plating with gold by electricity. The coin is placed in the fluid and attached to it are wires from the poles of the battery leading to another piece of metal prepared to receive, in the form of plating, the metal to be removed from the coin. The battery being set in motion, sufficient gold to form a plating is quickly transferred, and as it is removed uniformly from all parts of the coin, the liability of disfigurement is reduced to a minimum. The only effect is to blur the character slightly. About 50 cents' worth of gold can be removed in this way from a ten-dollar gold piece, without exciting the suspicion of the casual observer. To the skilled eye of an expert, however, the effect is generally apparent at a glance.

CLEANING COLORED WOOLENS.—Four ounces of white castile soap, four ounces of ammonia, two ounces of alcohol, two ounces of glycerine. Shave the soap in one quart of water over the fire. When dissolved add four quarts of rain water, and when nearly cold the other ingredients. Bottle and keep in a cool place. One cup of this mixture in two quarts of water will be sufficient for ordinary use. Now lay the goods on an old sheet, and iron rapidly and lightly on the wrong side, and then roll tightly on a certain pole or any round piece of wood. If this is carefully done you do away with the creases made by folding. For black silk or cloth dissolve one tablespoonful of borax and one tablespoonful of indigo in one pint of warm water. Sponge the pieces well and lay smoothly one above the other, and, if possible, put in the sun to dry.—*Ladies' Home Journal.*

FOR PAINTING WALLS OR OTHER OBJECTS EXPOSED TO DAMP.—A composition of very fine iron filings and linseed oil varnish is said to be much used in Germany; and, when the object to be painted is to undergo frequent changes of temperature, linseed oil and amber varnish are added to the first two coats. This paint may be applied to wood, stone or iron; in the case of the latter, it is not necessary to free it first from rust or oily matters.

DISTILLED SPIRITS CONSUMED IN THE ARTS. According to the new census report, the total quantity of distilled spirits consumed in the arts, manufactures, and medicine in the United States during the twelve months ending Dec. 13, 1889, was 10,976,842 proof gallons.

TO HARDEN FILES.—Rub a little hard soap across the teeth to keep from scaling; heat to a cherry red, and dip endwise in salt water; then dip in hot fresh water to remove any salt on the teeth, dry over the fire, and wet slightly with linseed oil on a rag.

THE COPPER MINES OF THE WHOLE WORLD are being taxed to their utmost to supply the demand for copper wire and the other apparatus used in the application of electricity.

STEAM BOILER NOTES.

Something About Safety Valves.

A writer on steam topics, Mr. A. N. Somerscales, says that "so long as a safety valve remains shut, the steam pressure acting on the underneath side of the valve is opposed by the weights of the load resting on the top, which may be either dead weight, a helical spring, or an arrangement of one of these acting through the agency of a lever. Now, either by calculation or by trial, it is possible to proportion the load to the area of the valve so that the valve shall be lifted off its seat when the steam has reached any particular pressure fixed upon as the blowing-off pressure."

What Happens When the Valve Opens.

When the valve opens the slightest amount of lift off the seat allows the steam to escape in all directions through the annular orifice between the edge of the valve and seat. Its velocity is very great—probably 800 feet per second. The steam in the immediate neighborhood of the valve seat escapes first, and its place is necessarily taken by other steam from the boiler, which also escapes. A current is thus set up not only through the orifice furnished by the valve, but also through the pipe leading to the same.

Now, a fluid will not commence to flow unless there is less pressure in front than behind. Therefore when the steam is rushing up the pipe leading to the valve seat, we may be certain that there is less pressure at the top of the pipes than at the bottom. In the case of a dead-weight valve, if it has to remain open and permit steam to escape, there must be as much pressure under the valve as balances the load on top. And as we know the pressure under the valve is less than the pressure in the boiler, the sole condition under which the valve can be kept open and allow steam to escape is that there must be some accumulation of pressure in boiler over and above the load on the valve.

If the valve is loaded to 110 pounds per inch, and the difference between the top and bottom of the pipe is four pounds, the pressure will be 114 pounds when blowing off.

To trace the action of the valve more closely, we may say that when the steam first begins to blow off, the valve will rise a very small distance off the face—so little, indeed, that the velocity of the steam up the pipe will be small and the reduction of pressure at the under side of the valve inappreciable. The small orifice thus opened being insufficient to relieve the boiler, an accumulation of pressure will result. The extra pressure acting on the valve will increase the lift until the reduction of pressure through the velocity of the steam in pipe is only just sufficient to balance the load on the valve as before.

If the boiler is still making steam faster than it is escaping, a further accumulation will occur and a further adjustment take place. But at any instant the pressure on the under side of the valve will always be 100 pounds above the atmosphere, even when the accumulation of pressure in the boiler is considerable.

Now, to prevent any considerable accumulation of pressure occurring when blowing off, it has always been the practice to make safety valves very much larger than the size of orifice actually required for the escape of all the steam which the boiler can make. If an area of about one-thirtieth of a square inch is actually required for the steam to blow through, safety requires an area of half a square inch in the safety valve.

Such being the practice, it follows that safety valves only need to lift a small fraction of an inch off their seats when blowing off, thus avoiding much accumulation of pressure due to the cause we have been considering.

THREE POUNDS of water per hour evaporated from each square foot of heating surface in a boiler is a fair average for a good boiler.

SUBSTITUTE FOR GUTTA-PERCHA.—A Portuguese gentleman, Senor da Costa, says *Invention*, is reported to have discovered an excellent and abundant substitute for gutta-percha, near Goa. It is the solidified fluid which issues from the *Nivul-cantem*, which grows wild in the Oconan diatrit, which is generally planted for bedges. It is insoluble in water, softens under heat, and hardens in the cold. It receives, moreover, and retains a given mold, can be cast into very thin sheets, and is capable of taking the minutest impressions upon its surface. Though white when it flows from the tree, in its dried state it is of a chocolate color, closely resembling gutta-percha. If this be true, the discovery is of enormous value.

SLIDING GROUND.—The *Nevada Herald* says: Below Boston Bar, near what is known as Keystone Flat, there is a tract of land of several acres, steadily sliding into the Yuba River. The amount of earth slowly moving into the river, and which will eventually be deposited in the valleys, shows that it is not hydraulic mining alone which creates debris, and this landslide is only one of the many to be found in the mountains and with which mining has no connection.

CAST-IRON TIES are now manufactured at Burrakur, Bengal, and at the works of the East Indian Company at Jamalpur, Bengal.



A. T. DEWEY.

W. B. EWER.

DEWEY & CO., Publishers.

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SAN FRANCISCO:

Saturday, March 28, 1891.

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(NEW THIS ISSUE.)

Water Wheels and Rock Breakers—The Pelton Water Wheel Co.
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Passing Events.

The receipt here this week of the first ingots of tin ever made in this country, marks an era in the mining industry of California and of the United States. The tin came from the San Jacinto estate tin mines, San Bernardino county, where smelting operations have just commenced. The mines have been known many years, but litigation has prevented their development until now.

The Santiam mines, Oregon, are again attracting attention, and machinery is now going in to work the ores. This is an old district, but the old mines relocated are proving of good value.

The Legislature adjourned on Wednesday night. This Legislature has either been the most objectionable or else the most unfortunate the State has lately seen. And yet it has done some very good things, and it is not unlikely that a careful estimate, after the memory of the unfortunate "sensations" of the session has passed away, may show its work better than it now is credited with. Such is usually the case, and such is at all events a charitable view to take of it.

A President has been selected for the new university at Palo Alto, whose duties will commence in September, so the institution will soon be in running order.

South African Gold Mines.

On another page is a letter from a correspondent in South Africa, who sends us a very interesting account of the operations around Johannesburg. The gold output of the district was about 100,000 ounces larger last year than ever before and more mines are being found. Several California gold miners are out in that region in charge of works, among them Chas. Pringington of Oakland, a very experienced and skillful millman well known on this coast. He has charge of the very extensive works of one of the English companies mining for gold.

Our correspondent sent us official records of the Witwatersrand Chamber of Mines, a series of monthly returns showing the result of operations of the Witwatersrand companies producing gold. There are several reefs and about 40 producing companies. From these statements we compute the following table, omitting the names of the companies and stating totals and averages for the district for the months of last year:

Months,	Tons milled.	Number of stamps.	Days milled.	Yield of Gold.	
1890.				Total.	Per ton.
				£	\$ & c.
January.....	45,988	865	23.74	122,818	2 12 5
February.....	48,651	839	23.49	129,615	53 9
March.....	49,951	839	22.19	132,785	2 12 10
April.....	49,810	850	22.47	135,439	2 13 7
May.....	54,517	1,045	22.67	138,896	2 9 13
June.....	52,920	1,010	22.28	131,038	2 9 4
July.....	53,653	1,212	25.99	135,469	2 9 11
August.....	59,544	1,175	21.70	150,231	2 6 8
September.....	56,356	1,240	23.62	159,430	2 4 6
October.....	69,643	1,035	25.42	158,923	2 9 9
November.....	72,435	1,155	26.39	164,149	2 3 9
December.....	40,135	804	22.37	135,136	3 3 9

As stated, this table shows totals and averages of all the companies in the Witwatersrand field. January of last year the yield was 35,006 ounces, valued at £3 10s per ounce. January of this year the yield was 53,205 ounces. The field produces between eight and nine million dollars gold per annum. Numerous discoveries have been made of late, and the gold-producing area will doubtless be extended still farther.

California Tin.

This week the first ingots of tin ever made in California arrived from the mines of the San Jacinto estate, Cajalco, San Bernardino Co. These are what were known as the Temescal tin mines, which were discovered many years ago. Litigation and other causes have prevented the claims from being developed, but now an English company has purchased and equipped them for active work. Oil fuel is used in the furnace, this being much cheaper in that region than coal. The experiments with the reverberatory furnace and oil fuel seem to be successful. The concentration tests, elsewhere referred to in detail, are also points of interest.

California and Dakota are the two tin-ore producing regions of the United States. Tin ore was discovered here first, but for many years was not utilized. The existence of tin in the Black Hills has also been known some years, and we have on our desk a small tin ingot made from Dakota ore some four or five years ago. For some reason, however, the deposits of that region have not been put in a producing shape to put the tin on the market in this country. Possibly the success of the California experiment will lead to further development of the tin industry elsewhere.

YUMA.—The recent heavy floods in Arizona have demonstrated the impracticability of maintaining the Southern Pacific track on its present bed in the vicinity of Yuma. As stated before, only temporary repairs have been made on a portion of the line damaged at this point, and in all probability Yuma has seen its last winter as a station on the line of the Southern Pacific.

THE Iron-Molders Union ordered a strike of the 16 molders at the Pacific Rolling Mills, Wednesday. The Rolling Mills employ 900 men, of whom only 16 were molders and these 16 have quit work.

WORKS on the plan of the Butters' reduction works at Kennet, Shasta county, will soon be put up in Mexico. Mr. Butters is now in Africa, putting up chlorination works there on his plan.

SEVERAL electric railroads are projected in Oakland, and one of them is about completed.

The Patent Centennial Celebration.

In the PRESS of March 14, an account was given of the coming celebration of the "Beginning of the Second Century of the American Patent System," which is to take place at Washington on the 8th, 9th and 10th of April. This is the first time in the history of the Republic that the inventors and manufacturers of patented articles have celebrated, and elaborate arrangements have been made by the committees having the affair in charge. The railroads leading into the National Capital have reduced their rates for the occasion, and a great crowd is expected. President Harrison will open the celebration, and the literary exercises will be presided over by some of the most eminent inventors in the country. Twenty addresses upon the different phases of invention will be delivered by men who are famous as masters of the subjects they will discuss. A national association of inventors and manufacturers of patented articles will be organized. There will be a reception at the Patent Office by the Secretary of the Interior and Commissioner Mitchell, at which it is expected Cyrus W. Field, Thomas A. Edison, George Westinghouse, George M. Pullman and others will assist. There will be a military parade, a grand excursion to Mount Vernon, a planked shad banquet at Marshall hall, near Mount Vernon, and the Navy Yard, the National museum, the Patent Office and other interesting national establishments will be open to the visitors.

The different public meetings will be presided over by the President of the United States, the Secretary of the Interior, the President of the National Board of Trade, the secretary of the Smithsonian Institute and Prof. Alexander Graham Bell.

April 10th is the anniversary of the signing of the first American Patent law: "An Act to Promote the Progress of the Useful Arts," by George Washington.

In addition to the expected addresses from prominent inventors and manufacturers at the meetings for the organization of the National Association, addresses upon the following subjects are promised at the public meetings:

Edward Atkinson, Ph.D., LL.D. of Massachusetts.—Invention in Its Effects upon Household Economy.

Dr. John S. Billings, Curator U. S. Army Medical Museum.—American Invention and Discoveries in Medicine, Surgery and Practical Sanitation.

Hon. Samuel Blatchford, Justice of the Supreme Court of the United States.—A Century of Patent Law.

Cyrus F. Brackett, M. D., LL.D., of New Jersey, Henry Professor of Physics, College of New Jersey, Princeton.—The Effect of Invention upon the Progress of Electrical Science.

Hon. Benjamin Butterworth of Ohio, U. S. House of Representatives.—The Effect of our Patent System on the Material Development of the United States.

Octave Chanute of Illinois, President of the American Society of Civil Engineers.—The Effect of Invention upon the Railroad and other means of Inter-Communication.

Professor F. W. Clarke, S. B., of Ohio, Chief Chemist U. S. Geological Survey.—The Relations of Abstract Scientific Research to Practical Invention, with Special Reference to Chemistry and Physics.

Hon. John W. Daniel of Virginia, U. S. Senator.—The New South as an Outgrowth of Invention and the American Patent Law.

Major Clarence E. Dutton, Ordnance Department, U. S. A.—The Influence of Invention upon the Implements and Munitions of Modern Warfare.

Thomas Gray, C. E., B. Sc., F. R. S. E., of Indiana, Professor of Dynamic Engineering, Rose Polytechnic Institute, Terre Haute.—The Inventors of the Telegraph and Telephone.

Professor Otis T. Mason, Ph.D., of Virginia, Curator U. S. National Museum.—The Birth of Invention.

Hon. Charles Eliot Mitchell of Connecticut, Commissioner of Patents.—The Birth and Growth of the American Patent System.

Hon. O. H. Platt, LL.D., of Connecticut, U. S. Senator.—Invention and Advancement.

Col. F. A. Seely of Pennsylvania, Principal Examiner U. S. Patent Office.—International Protection of Industrial Property.

Hon. A. R. Spofford, LL.D., Librarian U. S. Congress.—The Copyright System of the United States: its Origin and its Growth.

Hon. Robert S. Taylor of Indiana.—The Epoch Making Inventions of America.

Robert S. Thurston, A. M., LL.D., Doc. Eng., of New York, Director and Professor of Mechanical Engineering, Sibley College, Cornell University.—The Invention of the Steam Engine.

William P. Trowbridge, Ph.D., LL.D., of New York, Professor of Engineering School of Mines, Columbia College.—The Effect of Technological Schools upon the Progress of Invention.

Hon. Edwin Willits of Michigan, Assistant Secretary of Agriculture.—The Relation of Invention to Agriculture.

Hon. Carroll D. Wright, M. A., of Washington, Commissioner of Labor.—The Relation of Invention to Labor.

THE Albany M. & M. Co. has let a contract for \$30,000 worth of milling machinery for the Santiam mines, Oregon.

City Libraries.

The ceremonies of laying the corner-stone of the new Mercantile Library building occur on Saturday afternoon of this week, at the corner of Van Ness and Golden Gate avenues. Work on the building is being rapidly pushed, and already the first-story walls are nearly finished. The frontage on Van Ness avenue is 120 feet, and that on Golden Gate avenue 109 feet. The building will be three stories high, but so constructed as to admit of extra stories when desired.

The location is one where plenty of light can be obtained, a very desirable feature in library quarters. The library proper will be on the ground floor, and the second and third stories will be used for reading and chess-rooms. The cost of the building is estimated at \$100,000. When it is ready for use large additions of books are to be made, and an increase of membership is expected.

The managers of the Mercantile Library Association deserve great credit for the energy displayed in again placing the association on a proper basis. At one time it looked as if the institution would pass out of existence altogether. But with a fine building in a good location it will soon be restored to its former usefulness.

Another effect this move will have is to "stir up" the Mechanics' Institute people in the direction of permanent, enlarged quarters. There has been talk of this for a dozen years or so until many people have lost patience. The present building is old and unsuitable. Money has been added from the proceeds of fair after fair, and a good exhibition building put up, but the old library building continues in use, with its lack of space and all its inconveniences. With all its available assets, it would seem that a fine building with all modern conveniences, could be procured without further delay. The library of the Mechanics' Institute is superior in class and number to that of the Mercantile, but it is not apt to remain so very long if the latter has the "hook" its new building should give it. It is time for the Mechanics' Institute directors to take positively active steps in the direction of a new building, and not delay the matter much longer.

The Stanford University President.

Senator Leland Stanford has chosen for president of his new university Dr. David S. Jordan, who has been president of the Indiana University for the past seven years. The term of office at Palo Alto will begin next September, the salary being \$10,000 per annum and residence.

Professor Jordan is a scientist of acknowledged ability and standing, and has had also abundant experience as an educator. He is a broad-minded man of great energy and activity, who should be just the one to organize and equip the new institution of learning. The writer had the pleasure of forming the acquaintance of Prof. Jordan some years ago when he was in California collecting and identifying the fishes of this coast, and at that time became impressed with his earnestness and energy.

Professor Jordan is well known to all scientific men by his work in his chosen specialty, ichthyology. He was graduated from Cornell University in 1872, became instructor in marine botany at Pinkney two years later, and also took a medical degree at Indianapolis. As an expert on fishes, his services were secured by the Government in 1879-81 in taking a census of marine industries on this coast. He discovered many new varieties of fish on the California coast. He is recognized abroad as one of the leading authorities on North American fishes, and he has published a large number of papers on American fishes and a "Manual of the Vertebrates of the Northern United States." His collection of fishes is the largest private collection in the world. For several years he has been president of the Indiana State University, having been selected for the position because of his large executive capacity. He is about 40 years of age.

TRANSFER OF LEAD.—It is reported in New York that very large transfers of lead have been made this month. At times there has been a delay of 10 days before the stock could be taken from the transfer office on account of the large transfers.

Concentrating California Tin Ore.

(Concluded from page 193)

working, and instead of a No. 8 screen, a No. 12 (equal to a 48-mesh screen) was placed at the battery.

The concentrates yielded 70 per cent of tin metal. The tailings were found to contain, per ton of tailings, 2.6 lbs. cassiterite, equal to 1.82 lbs. of tin metal.

As you see, our general average of losses is below .1 of 1 per cent, or below .001, which is the least result ever obtained in dressing tin stuff. The best concentration work of Cornwall, England, loses .3 of 1 per cent or 6 pounds per ton.

Our tailings do not contain 2 pounds per ton, and this result is obtained with only one handling. During the first run with the Frue, 51,400 lbs. of ore from the old dump have been run through, producing 5713 lbs. concentrates, which is equal to a yield of 11.11 per cent of cassiterite, which contained 69.2 of tin metal, showing an average yield of 7.69 per cent of tin metal.

On February 18th we started the Woodbury concentrator, and the pulp of the battery was divided equally between the two concentrators.

See statement attached hereto. I made several other tests during this run with the same comparative results, showing that the Frue tailings are between three and four times poorer than those of the Woodbury.

I do not consider the Woodbury machine as well constructed as the Frue, and it is more liable to get out of order. The distributor does not work in a satisfactory manner at present, and this defect can be easily remedied, and one made to equally distribute our tin as desired. Respectfully submitted, HENRY MATHEY, Sup't.

Cajalco March 3, '91.

bury concentrator handled only one-half the pulp from the battery (5 stamp), or 6 tons per day, and could handle no more with good results, showing the error in the advertisement of the Woodbury concentrator, in which its capacity is claimed from 12 to 15 tons per day.

The Frue concentrator used was the regular four foot, plain belt machine. It handled 6 tons per day, which is the usual amount claimed for it.

Messrs. Adams & Carter, agents of the Frue concentrator, have in addition the following to say: "Since the above report was made out, an expert from Cornwall has examined the concentrations from each machine and has stated that the concentrations from the Woodbury machine were not clean enough to smelt and that they must be re-concentrated, which was done on the Frue. He also stated that the Frue concentrations were all right. Although the Woodbury concentrator has been running less than two months (it was started up Feb. 18th), Mr. Woodbury had to send down a complete set of new belts on March 22d, as the other set was fast going to pieces."

Adjustable Perch for Bird-Cages.

John F. Sweeney of 632 Market St., this city, has patented, through the MINING AND SCIENTIFIC PRESS Patent Agency, a medicated adjustable perch for bird-cages, which forms a convenient and valuable improvement for the home

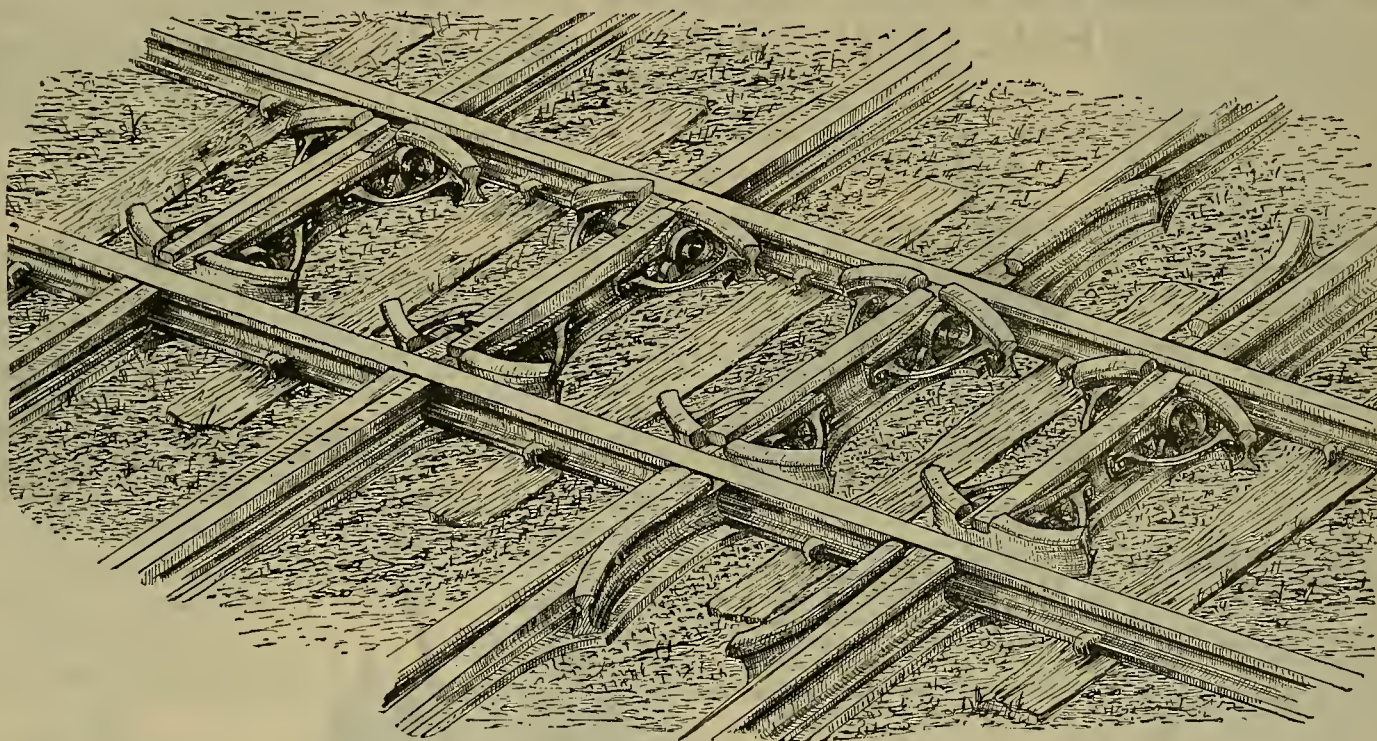
shown roughened and is medicated so that the birds are always kept healthy and protected from vermin.

Each perch may be raised or lowered or held at any desirable point by the frictional pressure of the wires upon the holder B. By this construction the perches are easily supported within the cage and in proper positions with relation to each other, so that the bird can easily fly from one perch to the other without danger of breaking or damaging its feathers; and no perch need be placed over another one so as to become soiled or dirty. The perches are thus kept clean and do not need frequent washing.

Axtell's Railway Crossing.

Walter M. Axtell of Fruitvale, Alameda county, has obtained through the MINING AND SCIENTIFIC PRESS Patent Agency a patent on an improved railway crossing which is herewith illustrated. The advantages of this crossing over others of its class are that it presents at all times an absolutely continuous track for both the crossing and the crossed rails. All the rails composing it are solid and unbroken throughout, connection between the end of the inner section of the crossing rail and the head

The normal position of the guard is close up to the inner side of the rail to be crossed. The outer section of the crossing rail comes up close to the outer surfaces of the rail to be crossed, and the two inclined planes are close to the surface of the main-line rail. Now a wheel traveling upon the crossing track and approaching the main-line track to be crossed, the flange runs up on the inclined plane, and across the main track, on to the inclined plane of the guard and down said plane until the tread of the wheel again rests on the head of the intervening section of the crossing rail. As it reaches the other side, the flange travels up the opposite inclined plane of the opposite guard across the rail and down the inclined plane of the outside section until the tread of the wheel again crosses down on to the head of the outside section of the crossing rail. The wheel, in moving on the inclined plane, travels on its flange only about one-fifth of its circumference on each side. It will thus be seen that a continuous crossing track is provided. Nor does this interfere with the use of the track to be crossed, for the reason that as a wheel approaches on said track, its flange, entering behind the inwardly curved arm of the guard, presses the whole of said guard backward from the rail,



AXTELL'S PATENT IMPROVED RAILWAY CROSSING.

Mr. Henry Mathey, Sup't. San Jacinto Estate, Ld., Cajalco, Cal.—DEAR SIR:—The foregoing report I consider thoroughly consistent with the results obtained in our tin-test mill, during the time and manner stated by you.

I have been a daily as well as interested observer of the workings of the two machines named, and feel justified in indorsing your conclusions. Very truly yours, E. N. ROBINSON,

General Manager San Jacinto Estate (Limited). Woodbury Concentrator vs. Frue Concentrator—Comparative Tests.

WOODBURY CONCENTRATOR.

Tailings contain per ton of 2000 pounds avoirdupois. Feb. 24, Test No. 1, 19 lbs. tin oxide, equal to 13.3 lbs. tin metal; Feb. 28, A. M., Test No. 2, 4.4 lbs. tin oxide, equal to 3.08 lbs. tin metal; Feb. 23, P. M., Test No. 3, 10.8 lbs. tin oxide, equal to 7.66 lbs. tin metal; March 2, Test No. 4, 9 lbs. tin oxide, equal to 3.43 lbs. tin metal; average, 9.775 lbs. tin oxide, equal to 6.842 lbs. tin metal.

Concentrates yielded 66% tin metal. They contain 1.7% of iron. Concentrates of Run No. 4, 67% tin metal.

FRUE CONCENTRATOR.

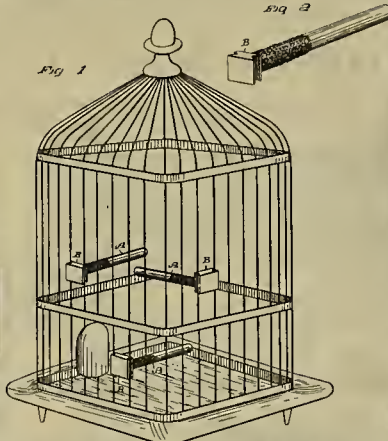
Tailings contain per ton of 2000 pounds avoirdupois. Feb. 24, Test No. 1, 4.4 lbs. tin oxide, equal to 3.08 lbs. tin metal; Feb. 28, A. M., Test No. 2, 3 lbs. tin oxide, equal to 2.1 lbs. tin metal; Feb. 23, P. M., Test No. 3, 2.4 lbs. tin oxide, equal to 1.65 lbs. tin metal; March 2, Test No. 4, 1.8 lbs. tin oxide, equal to 2.3 lbs. tin metal; average, 2.9 lbs. tin oxide, equal to 2.03 lbs. tin metal.

NOTE.—In these tests the cassiterite, being very clean, is figured as containing 70% of tin metal. Concentrates yielded 72% tin metal. They contain 1.26% of iron. Concentrates of Run No. 4, 66% tin metal. Sample for Test No. 4 was taken by myself. Sample for test No. 2 [was taken by Mr. Brownell, agent for the Frue. Sample for Test No. 3 was taken by Mr. Woodbury. Sample for Test No. 4 was taken by myself.

During the Test No. 4 the two machines were run by one of our engineers, Mr. Perrin. Since we have started running the two concentrators, 36 tons of ore have been crushed from the old dump. Signed, HENRY MATHEY.

NOTE.—As can be seen by the foregoing, the Wood-

comfort of birds in cages. The perch (which is shown in various positions within the cage in Fig. 1) is clearly shown



ADJUSTABLE MEDICATED BIRD-CAGE PERCH.

on a larger scale in the detached view, Fig. 2. B is the grooved holding-block fixed to one end of the perch so that the latter projects at right angles from it. By springing the wires of the cage slightly apart, the block B can be inserted between them, and it and the perch will be held at any desired height by the pressure of the wires in the grooves in the edges of the block. That portion of the perch nearest the end is

of the crossed rail being made by sliding planes located in the movable guard, which presents always a solid track for the crossing road and is pressed backward out of the way by a wheel traveling on the crossed rail, immediately springing back into place again after such passage.

The out shows both T and flat rails crossing a T rail, one of each inner section being closed (as in normal position) for a wheel traveling on the crossing rails, and one of each sprung open as it would be with a wheel passing on the crossed rail.

The rails of the crossing track are provided with an underlying shoe or stringer extending several feet on each side of the track to give a firm and continuous foundation for the crossing tracks and preventing springing or jolting. The movable guard consists of two inwardly-curving arms having a notch or groove at their middle to fit up to and slide beside the head of the intervening or middle section of the crossing rail, backwardly extending braces and connecting pieces joining the inner ends of the middles of the arms with the rear ends of the braces and fitting into and sliding in the web of the crossing rail on each side. This guard has a sliding movement and springs hold it up close to the inner surface of the rail of the track to be crossed. The middle portion of the guard is provided with an inclined plane, the upper end of which lies flush with the head of the rails of the other track. The inner side of the crossing rail is provided with a corresponding inclined plane, as shown.

so that the flange can travel by it without interference, and as soon as it has passed, the springs throw the guard back again to its normal position to close up the joint of the crossing track.

The inventor claims that it is impossible for this crossing to get out of order so far as to cause any damage or cessation of traffic, there being no complicated mechanism about it, and no accident (traceable to principle and construction) could possibly happen which would cause it to present at any time an obstruction to either crossing or crossed rails.

Another point in its favor is that each separate movable guard (i. e. sliding guard and inclined planes on each end of each inner section of crossing rail) works entirely independent of the others, not one of them depending upon the working of any other part of the crossing. This principle is not confined to the T rail alone, but is applicable to any form. It is not necessary to cut or at all interfere with the rails of the track crossed. While the first cost of this crossing may be a little greater than that in ordinary use, it will save in wear and tear on rails and rolling stock several times its cost in the course of a year.

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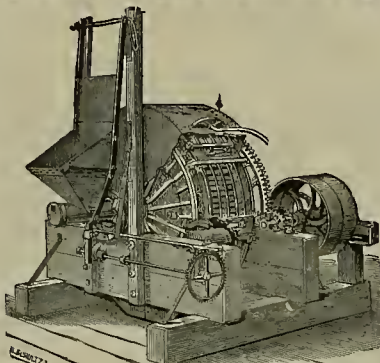
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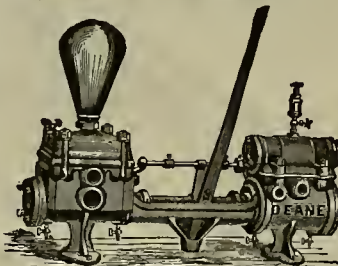
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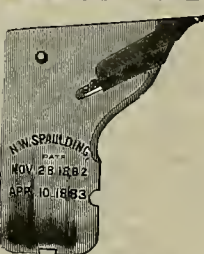
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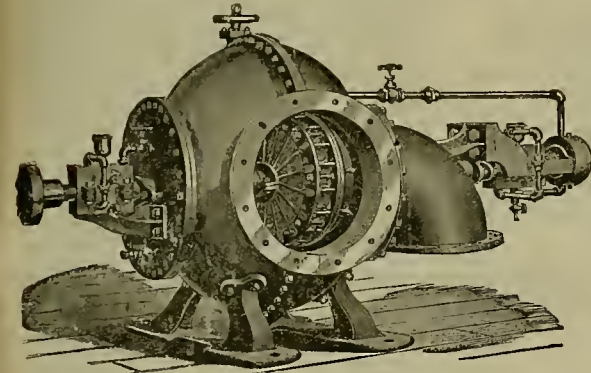


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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, March 25, 1891.

General trade is reported fairly active, with a number of distant buyers in the market. Among iron workers, business is reported better than at this time in 1890. The local money market is easy, with collections in all parts of the coast reported good. The recent advance in prices of cereals and better freight facilities allowed Washington and Oregon farmers to sell their grain to good advantage. This, together with marketing of other products, eased the money market up north. In this State farmers are reported to be, as a rule, easily circumstanced. The weather for growing crops continues unusually favorable.

QUICKSILVER—Receipts the past week aggregate 115 flasks. The demand is fair. The market appears to have a more settled tone.

MEXICAN DOLLARS—The market is barely steady around 78¢ cts. The steamer city of Peking for Hong Kong left on the 21st, taking out \$157,840.

SILVER—Department purchases in this month are reported as follows:

Date.	Offered ounces.	Purchased ounces.	Price paid per ounce.
March 2.....	1,480,000	105,000	\$.93250 to \$.93750
March 4.....	745,000	745,000	.93500 to .93750
March 6.....	1,000,000	278,000	.93250 to .93350
March 9.....	1,109,000	570,000	.93250 to .93700
March 11.....	355,000	355,000	.93700 to .93900
March 13.....	670,000	303,000	.93900 to .93950
March 16.....	—	377,000	.93900 to .93950
March 18.....	662,000	412,000	.93900 to .93900
March 20.....	1,204,000	259,000	.93925 to .93940
March 23.....	1,204,000	526,000	.93940 to .93900
March 25.....	533,000	229,000	.93900 to .93920

Total..... 4,167,000
* Purchases over the counter during the week ending March 7th—407 ounces.

The monthly quota of 4,500,000 ounces will probably be met on to-morrow (Friday) Department day. The market has been receding, why, no one appears to have any valid reason. Eastern advances report more foreign buying, while our English exchanges are confident of an increased demand this spring from India. The steamer that sailed home on last Saturday for China, took out 161,700 ounces for Bombay. This, with the preceding shipment aggregate about 187,000 ounces in this month. It is claimed that other shipments will follow.

The decline in silver can doubtless be traced to the bug-a-boo cry over the Treasury charging for withdrawal of gold bullion from government assay offices or mints. The tempest in a teapot raised over this action of the Treasury, has been formed by speculators in silver, and all securities whose values are grounded on the market price of silver. Had it not been for this speculative influence the last Congress would have given us free coinage. It is claimed that manipulators of mining shares are strong opponents of free coinage.

BORAX—The market is steady, with a good demand from the East.

LIME—Receipts the past week aggregate 7538 bbls, and exports by sea 1730 bbls, of which 1650 bbls went to Honolulu. The demand the past week showed an enlargement, due to more improvements in various parts of the State.

TIN—Imports the past week aggregate 3858 ingots from Australia. The market is reported essentially unchanged since our last week's review.

LEAD—The market is reported unsettled with cutting in prices still in order. Judging from the tone of our eastern advices we can reasonably look for an improvement before the spring months pass.

IRON—Imports the past week aggregate 100 tons from Irondele. The local market is heavy and unsettled. Dealers are carrying large stocks, while consumers are not disposed to buy beyond current requirements. Shotts & Thomas are about out of market. Although no changes in quotations are made, yet it is claimed that orders can be placed for spot parcels at less than quoted by us.

COAL—Imports the past week aggregate as follows: Tacoma, 6000 tons; Departure Bay, 5500; Nanaimo, 2445; Seattle, 2860; total, 16,805. The market for spot is unchanged. The consumption is said to be free for the season, but the stock, coast supply and Australian on the way, are large. Cargo buyers are not willing to enter the Australian markets for shipment at present selling offers. They claim that after the bulk of the wheat surplus of Australia is shipped, vessels will offer freely for coal loading to this port, which will bring about lower selling offers for coal.

Eastern Metal Markets.

By Telegraph.

NEW YORK, March 26.—The following are the closing prices the past week:

	Silver to Silver in London.	Copper.	Lead.	Tin.
Thursday.....	45 1-16	93 1/2	13 90	4 37 1/2
Friday.....	45 3-16	99	13 90	4 37 1/2
Saturday.....	45 3-16	93 1/2	13 90	4 37 1/2
Monday.....	45 1-16	98 1/2	13 90	4 40
Tuesday.....	44 1/2	97 1/2	13 85	4 37 1/2
Wednesday.....	44 1/2	97 1/2	13 85	4 37 1/2

Borax active and firm, with a fair supply of California powdered at 33¢ concentrated, 35¢ in car lots and 38¢ jobbing. In Quicksilver there has been a light trade at 63¢@64¢. Iron is barely steady. Copper continues unsettled. Tin has a firmer tone. Lead is steady.

Coal and Coke.

SPOT FROM YARD—PER TON.	TO LOAD—PER TON.
Wellington.....	\$10 00 Australian.....
Greta.....	9 00 Liverpool S'm.....
Carbon Hill.....	8 00 Scotch Splint.....
Nanaimo.....	10 00 Cardiff.....
Gilman.....	7 50 Lehigh Lump.....
Seattle.....	7 50 Cumberland bk.....
Coos Bay.....	7 00 Egg, hard.....
Cannel.....	9 50
Egg, hard.....	16 00
Cumberland, in sacks.....	14 00
do, bulk.....	13 00
Walsend.....	9 00
Scotch Splint.....	9 50 To load.....
Brymbo.....	9 00 Spot, in bulk.....

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MARCH 17, 1891.

- 448,330.—DEVICE FOR CONTROLLING HORSES—E. J. Fraser, S. F.
448,348.—WINDMILL—E. L. Kenoyer, Hanford, Cal.
448,526.—WASHING MACHINE—Lamborn & Rickards, Dixon, Cal.
448,357.—CHAFF SEPARATOR FOR THRASHERS—G. E. Minges, Atlanta, Cal.
448,363.—PRUNING IMPLEMENT—Perry & Dixon, Santa Rosa, Cal.
448,366.—HORSESHOE GAGE—W. C. Price, Woodburn, Or.
448,369.—VAPOR ENGINE—D. S. Regan, S. F.
448,462.—BEARING BOX—Geo. St. Pierre, Oakland, Cal.
448,467.—WINDOW SCREEN—Frank Walker, Los Angeles, Cal.
448,394.—SEPARATOR—F. H. Wheeler, Santa Barbara, Cal.
448,287.—CABLE GRIP—Wood & Fowler, Los Angeles, Cal.

The following brief list by telegraph, for Mar. 24, will appear more complete on receipt of mail devices:

- California—Nicklaus Anderson, Marysville, portable elevator; Newton M. Bell, S. F., manufacturing borax; William F. Bowers, S. F., swing hose reel; James Martin, Temescal, flower holder; Sidney W. Miller, Pasadena, flush tank; Ernest Natic, S. F., gas engine; Ernest L. Ransome, S. F., illuminating panel in concrete floors; John H. Wallace, S. F., switch stand; Oregon—Arthur Conklin, Grant's Pass, fruit dryer; Evan W. Jones, Portland, lathe for turning shafts.
Nora.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

DEVICE FOR CONTROLLING HORSES—Edwin J. Fraser, 112 Kearny, S. F. No. 448,330. Dated March 17, 1891. This device is intended for controlling spirited, vicious, or hard-mouthed horses, and it consists of pads adapted to press upon and close the nasal passages, and a means by which said pads are actuated in connection with the bit and reins so that the operation of the device will be automatic, acting to compress the nasal passages when the horse commences to pull too hard and instantly relieving itself when he becomes quiet.

MANUFACTURE OF BRICKS—Ernest L. Ransome, S. F. No. 447,972. Dated March 10, 1891.

Under the process of manufacturing unburned bricks which is described in the patent granted to the same inventor in July, 1885, a chemical action takes place between the lime or its equivalent and the silica of the ashes or their equivalent, which are used in the manufacture of the bricks. Such chemical action results in the hardening of the bricks, and this action is necessary to the success of the process both as the same is described in the former patent and as it is now improved. The present invention includes the discovery that the chemical action mentioned will be greatly facilitated if the bricks are immersed in water after they are molded and pressed; also, in the further discovery that such chemical action will be still further accelerated by having present in the material during such chemical action some of the soluble alkaline salts which naturally exist in the ashes of ordinary wood and coal; also, in the discovery that by the treatment described in the patent, a valuable solution of soluble salts can be incidentally and cheaply produced as a by-product during the manufacture of the unburned bricks. Under the process described in the previous patent, the soluble salts which were contained naturally in the ashes were removed before the material was molded. Under that patent, the molded bricks were not immersed in water. In the present improved process or method of treatment, the ashes are mixed with the lime as described in the previous patent, except that the ashes are not washed. The mixed material is then moistened just enough to make it adhere together in a mass. In this condition the material is molded and pressed into bricks, blocks or other forms, as desired. By exposing these molded and pressed bricks or blocks, while they are moist, to the atmosphere, they will soon become sufficiently hard to endure immersion in a water bath without danger of being disintegrated thereby. When the bricks are thus sufficiently hardened, they are immersed in batches in baths of water.

PRUNING IMPLEMENT—James W. Perry & Robt. H. Dixon, Santa Rosa, Sonoma Co. No. 448,363. Dated March 17, 1891. This invention relates to the general class of pruning shears and especially to that sub-class having a sliding or movable fulcrum between the opposing members, whereby what is known as a "draw cut" may be had. By the peculiar construction the blade has its longitudinal movement independent of the handles, which latter therefore remain in the same position and do not move lengthwise, as is customary with one or both handles in other form of shears wherein a sliding fulcrum is employed to provide for a draw cut. Therefore these shears are less tiresome to use, as the handles do not move lengthwise in the hand but remain stationary in that respect.

SEPARATOR—Fairfax H. Wheeler, Santa Barbara. No. 448,394. Dated March 17, 1891. This is a machine specially adapted for cleaning wheat and the cereals and leguminous seeds by separating them from the particles of dirt and other foreign material. The principle of separation involved in this device is that of frictional contact. Separation which depends on differences in size and upon differences in weight cannot be had where such differences do not exist. Thus with cereals and pulse it often happens that particles of dirt and rock have equal size and weight with the grains or seed of the material to be saved; and such particles have not the

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	No. AMT. LEVIED.	DELINQ'T AND SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Coos M Co., Nevada.....	7.....	25c.....	Mar 14, Apr 17, May 7.....	C E Elliott..... 309 Montgomery St
Atlantic Coon M Co., Nevada.....	7.....	25c.....	Nov 19, Apr 17, May 7.....	D M Kent..... 330 Pine St
Belcher M Co., Nevada.....	41.....	50c.....	Feb 17, Mar 24, Apr 13.....	C L Perkins..... 331 Pine St
Best & Belcher M Co., Nevada.....	43.....	25c.....	Feb 17, Mar 25, Apr 15.....	L Osborn..... 309 Montgomery St
California State Co., California.....	5.....	30c.....	Feb 2, Mar 15, Apr 20.....	J O Henscom..... 9 Mission St
Cardonhale Coal M Co., California.....	1.....	10c.....	Mar 13, Apr 21, May 7.....	E L Alken..... 328 Montgomery St
Confidence S M Co., Nevada.....	13.....	75c.....	Feb 15, Mar 19, Apr 9.....	A S Groth..... 414 California St
Contra Estaca Coe Max M Co., Mexico.....	1.....	50c.....	Dec 15, Feb 14, Apr 4.....	George Gale..... 309 Montgomery St
Con St Gothard M Co., California.....	2.....	15c.....	Feb 12, Mar 31, Apr 23.....	J Wetzel..... 320 Sansome St
Cosmopolitan M Co., Nevada.....	5.....	10c.....	Feb 24, Apr 7, Apr 29.....	B Burris..... 240 Montgomery St
Crescent M & M Co., California.....	5.....	25c.....	Feb 20, Apr 6, May 4.....	J H Isham..... 310 Pine St
Crown Point G & S M Co., Nevada.....	54.....	35c.....	Feb 19, Mar 23, Apr 19.....	J Newlands..... 331 Pine St
Crocker M Co., Arizona.....	10.....	10c.....	Feb 16, Mar 20, Apr 13.....	N T Messer..... 309 Montgomery St
Gould & Curry M Co., Nevada.....	55.....	30c.....	Feb 3, Mar 11, Apr 7.....	A K Durbow..... 309 Montgomery St
Gray Eagle M Co., California.....	22.....	3c.....	Feb 5, Mar 9, Apr 30.....	A W Barrows..... 303 California St
Guacaran & Cal M Co., Ho duras.....	4.....	85c.....	Mar 14, Apr 15, May 4.....	E Oliver..... 22 Mint Av
Hale & Norcross M Co., Nevada.....	35.....	50c.....	Mar 17, Apr 22, May 14.....	A B Thompson..... 309 Montgomery St
Lady Washington M Co., Nevada.....	8.....	25c.....	Mar 3, Apr 7, Apr 28.....	L Osborn..... 309 Montgomery St
Locomotive M Co., Nevada.....	10.....	5c.....	Mar 17, Apr 21, May 12.....	A H Fish..... 309 Montgomery St
Martin White M Co., Nevada.....	25.....	50c.....	Feb 2, Mar 6, Apr 30.....	A B Cooper..... 325 Montgomery St
Middle Creek M C., British Columbia.....	2.....	7c.....	Mar 23, Apr 19, Apr 19.....	J H Newlands..... 331 Pine St
Mexican M Co., Nevada.....	42.....	25c.....	Feb 9, Apr 14, May 5.....	C E Elliott..... 309 Montgomery St
Mineral King M Co., Arizona.....	5.....	10c.....	Mar 23, Apr 23, May 18.....	T F Norman..... 419 California St
Nevada Queen M Co., Nevada.....	7.....	15c.....	Mar 4, Apr 10, Apr 30.....	R R Grayson..... 331 Pine St
N. Gould & Curry G & S M Co., Nevada.....	12.....	25c.....	Jan 10, Feb 11, Feb 23.....	C H Masoo..... 331 Montgomery St
Northwestern M Co., British Columbia.....	2.....	7c.....	Mar 9, Apr 9, Apr 27.....	T Bonachia..... 438 California St
Savage M Co., Nevada.....	75.....	50c.....	Feb 13, Mar 18, Apr 7.....	E B Holmes..... 309 Montgomery St
Silver King M Co., Arizona.....	5.....	20c.....	Feb 21, Mar 28, Apr 23.....	S Motile..... 325 Montgomery St
Valley View M Co., California.....	1.....	2c.....	Feb 9, Mar 13, Apr 13.....	W J Gunnert..... 308 Pine St

MEETINGS TO BE HELD.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Bulwer Coos M. Co.....	California.	L. Osborn.....	309 Montgomery St.....	Annual.....	Apr 3
Germania Lead Works.....	Utah.	J. M. Quay.....	124 Sansome St.....	Annual.....	Apr 1

LATEST DIVIDENDS—WITHIN THREE MONTHS.

NAME OF COMPANY.	LOCATION.	SECRETARY.	OFFICE IN S. F.	PAYABLE.
Candelaria Cons M. Co.....	New Mexico.	G. Gale.....	309 Montgomery St.....	25.....Dec 3
Commonwealth M. Co.....	Nevada.	R. R. Grayson.....	331 Pine St.....	20.....Nov 20
Champion M. Co.....	California.	T. Wetzel.....	320 Sansome St.....	10.....Mar 15
Pacific Coast Borax Co.....	California.	A. H. Clough.....	230 Montgomery St.....	1 00.....Mar 10
Jackson M. Co.....	California.	W. E. Drake.....	311 Pine St.....	10.....Jan 19

same character of surface, and by this is meant not particularly form or shape, but smoothness and roughness. As a matter of fact, the surface of grains and seeds is much smoother than that of the particles of dirt and rock which are mixed with them. This invention is based on this fact; and its object is to separate thoroughly the foreign particles from the seeds and grains and even to separate out imperfect and mutilated grains and seeds, and branches, twigs, etc.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, March 25, 1891.	
ANTIMONY.....	— @ 18
BORAX—Refined, in carload lots.....	8 @
Powdered.....	8 @
Concentrated.....	7 1/2 @
All grades jobbing at an advance.	
COPPER.....	
Bolt.....	23 @
Sheeting.....	23 @
Ingot, jobbing.....	18 @
Do, wholesale.....	17 @
Fire Box Sheet.....	23 @ 25
LEAD—Pig.....	— @ 42
Bar.....	— @ 51
Sheet.....	7 1/2 @
Pipe.....	5 1/2 @
Sheet, discolored, 100 bags, Drop, 3/4 bag.....	2 00 @
Buck, 3/4 bag.....	2 00 @
Chilled, do.....	2 20 @
QUICKSILVER—By the cask.....	3 45 @ 50
Flasks, do.....	40 @ 50
CHROME IRON ORE.....	10 @ 50
STEEL—English, B.....	15 @ 20
Canton tool.....	9 @ 9
Black Diamond tool.....	8 @ 8
Iron Hammer.....	8 @ 8
Machine.....	4 @ 5
Toe Calk.....	4 @ 4
TINPLATE—B. V., steel grade, 14x20, to arrive.....	5 50 @
B. V., steel grade, 14x20, spot.....	6 37 @
Chase, 14x20.....	5 50 @
Do, roofing, 14x20.....	5 00 @
Do, do, 20x28.....	13 00 @
Pig tin, spot, 1/2 lb., irregular, nominal.....	20 @ 21 1/2
IRON—Bar, base.....	42 @ 51
Norway, base.....	42 @ 51
Spot.....	To Load.
IRON—Glenbrook ton.....	30 00 @
Eglington.....	29 00 @
American Bolt, No. 1, ton.....	— @ 30 00
Oregon Bolt, No. 1, ton.....	— @ 30 00
Puget Sound.....	30 00 @
Olaf Lane White.....	25 00 @
Shotts, No. 1.....	23 00 @
Langdon.....	23 00 @
Thorpe.....	23 00 @
Gartsherr.....	30 00 @
Berrow.....	30 00 @
Cargoeet.....	30 00 @

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

- GEO. WILSON—Sacramento Co.
J. C. HOAG—San Francisco.
F. W. KNAPP—Amador Co.
GEORGE EVANS—Santa Clara Co.
MRS. M. E. DUDLEY—Ventura Co.
W. U. WANDSWORTH—Sutter and Yuba Cos.
ANDREW REID—Monterey Co.
M. S. PRIME—Alameda and Contra Costa Cos.
F. B. LOGAN—Sacramento, Cal.
D. G. CLARY—Sonoma Co.
E. L. RICHARDS—San Diego Co.
O. N. CANNELL—Carpinteria, Cal.
S. S. SAUL—Fresno Co.
B. F. BELT—Shasta Co.
E. H. CHARFLE—Central California.
A. S. COOLEY—Tehama Co.
H. C. HENKLE—Cape Valley.
SAMUEL CLIFF—Creston, Cal.
JOHN SIMPSON—Oregon.
WM. M. HILLARY—Oregon.
WM. HOLMES—Oregon.
WM. OLSON—Washington.

Successful Patent Solicitors.

As Dewey & Co. have been in the patent soliciting business on the Coast now for so many years, the firm's name is a well-known one. Another reason for its popularity is that a great proportion of the Pacific Coast patents issued by the Government have been procured through their agency. They are, therefore, well and thoroughly posted on the needs of the progressive industrial classes of this Coast. They are the best posted firm on what has been done in all branches of industry, and they have a great advantage, which is of practical dollar and cent value to their clients. That this is understood and appreciated, is evidenced by the number of patents issued through their SCIENTIFIC PRESS Patent Agency (S. F.) from week to week and year to year.

THERE is some excitement at Glenbrook, Lake Tahoe, over the discovery of rich gold-bearing ore in the vicinity. Numbers of men are out on snow-shoes looking for quartz.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 5.	WEEK ENDING Mar. 12.	WEEK ENDING Mar. 19.	WEEK ENDING Mar. 26.
Alpha.....	70 .80	65 .80	1.00 .90	1.20 .90
Alta.....	70 .80	55 .75	70 .75	80 .65
Andes.....	1.20 1.40	1.20 1.60	1.50 2.00	1.55 1.85
Belcher.....	1.30 1.40	1.35 1.51	1.70 2.00	2.70 .65
Best & Belcher.....	2.70 3.10	2.85 4.00	6.00 5.50	8.50 5.00
Bodie.....	2.00 2.10	2.30 2.35	2.80 2.85	7.50 7.50
Bodie Con.....	1.05 1.10	1.10 1.10	1.15 1.20	1.50 1.50
Bulwer.....	40 .50	35 .50	40 .50	40 .50
Commonwealth.....	75 .75	75 .75	80 .85	1.00 .85
Con. Va. & Cal.....	5.50 5.75	5.25 5.50	9.50 9.57	13.50 10.87
Challenger.....	1.80 1.90	2.40 2.45	3.20 3.25	3.50 3.10
Chollar.....	2.05 2.10	2.40 2.40	3.40 3.40	3.85 3.30
Confidence.....	4.30 4.25	5.00 5.25	5.52 5.50	8.50 8.00
Con. Imperial.....	15 .20	15 .20	20 .30	20 .30
Crown Point.....	1.35 1.50	1.30 1.65	1.70 2.35	2.00 2.75
Crocker.....	.....	.....	.05 .15	.20 .25
Del Monte.....	25 .10	20 .10	20 .30	30 .30
Eureka Con.....	.....	.....	3.00 3.75	3.80 .90
Excelsior.....	70 .75	75 .80	1.05 1.05	1.75 1.00
Grand Prize.....	15 .10	15 .10	20 .20	20 .25
Gould & Curry.....	1.35 2.05	1.90 2.45	2.75 4.10	3.05 3.75
Hale & Norcross.....	1.90 2.10	1.75 2.05	2.15 2.60	2.60 2.60
Julia.....	15 .20	15 .20	20 .30	20 .30
Justification.....	85 .35	85 .35	1.05 1.10	1.40 1.20
Kentuck.....	35 .40	35 .40	40 .55	55 .55
Lady Wash.....	15 .25	15 .25	15 .20	15 .20
Mono.....	50 .60	50 .60	50 .75	55 .75
Mexican.....	2.40 2.55	2.40 2.95	3.00 4.50	4.50 4.50
Navajo.....	50 .55	50 .55	55 .85	90 1.25
North Belle Isle.....	50 .55	50 .55	55 .85	90 1.25
Nav. Queen.....	20 .15	20 .15	20 .30	30 .30
Occidental.....	85 .90	85 1.10	1.15 1.50	1.60 1.40
Peck.....	3.55 3.75	4.00 4.55	6.85 6.25	5.50 5.50
German.....	4.50 4.50	5.00 5.00	7.75 7.75	8.00 8.00
Potosi.....	4.50 4.80	4.10 5.37	6.00 5.00	4.20 5.80
Peerless.....	10 .10	10 .10	10 .15	15 .20
Peck.....	10 .10	10 .10	10 .15	15 .20
Baragans.....	1.30 2.10	1.80 2.10	2.10 2.92	2.75 2.75
S. E. & M.....	80 .85	80 1.05	1.50 1.20	1.50 1.20
Sierra Nevada.....	2.15 2.35	2.10 2.55	3.40 3.10	3.80 3.80
Silver Hill.....	20 .20	20 .20	20 .25	25 .30
Scorpion.....	40 .15	20 .20	20 .35	40 .40
St. Louis.....	2.25 2.40	2.50 2.75	2.70 2.70	3.00 3.00
Utah.....	70 .75	85 .80	1.30 1.10	1.40 1.40
Yellow Jacket.....	2.05 2.20	2.10 2.50	3.40 3.50	3.50 3.50

Mining Share Market.

Mining shares the past week set back from Thursday morning to the close of the informal session on Saturday. Potosi and Bullion led in the break under an inside raid. The break-neck fall in the prices of other stocks to throw their holdings on the market, of which manipulators took advantage to buy at lower prices. The decline ranged from 25 to 50 per cent. On Monday under news from Virginia that Con. Virginia's assays were higher, there was a lively jump in the latter stock, causing the entire list to move in sympathy. Since then the market has fluctuated to slightly higher prices. Yesterday (Wednesday) afternoon, Overman surprised the street by one of its mysterious moves.

The feature of the market for outside mining shares, has been a steady up move in the Tuscaroras. As these stocks are reported well in hand, and several of the mining companies have considerable rich ore stored for milling, a good bull move can be made by insiders.

Virginia papers, notably the *Enterprise*, appear to be hedging on the one ledge theory, and getting ready to champion the MINING AND SCIENTIFIC PRESS, well known views of a west ledge, generally known as the Red Lode. That there is a well defined west ledge, was established by a suit some years ago, and it now looks as if more suits will before long be brought which will set the question forever at rest. Well informed Comstock miners are outspoken in their belief that several of the Comstock mines have been and are still taking out and milling ore belonging to mines on the Red Lode. Their workings to the west have been made in more or less of a zig zag course to mystify or deceive, perhaps both. Some day there will be a reckoning, and stockholders as usual will have to foot the bill.

Points are out for another break in prices. The break, it is claimed, will be from 40 to 60 per cent from top prices when it sets in. It is said that before breaking prices ought to go some higher so as to sell stock to uncover margin.

From the Comstock mines, uniformly good news comes to hand. In Con. Virginia they are uncovering to the west good to high-grade ore on several levels. In Gould and Curry they have progressed so far in uncovering ore going from \$30 to \$80 a ton, that it is in contemplation to commence milling at an early day in next month. In Best and Belcher the work is westward to strike the continuation of the ore found in Con. Virginia. In Ophir and the mines lying to the north important work is under way. In Savage and also in Hale and Norcross the work if done in the north end mines, would lead to the milling of rich ore and to the paying of dividends. Perhaps public opinion backing the suits now in court, may yet force the managers to "come to time" and work in the interest of all stockholders. From Chollar, Potosi and Bullion there is nothing new to report, and probably there will not be until outsiders have given up their lines of stocks. The same remarks would seemingly cover the situation in the Gold Hill mine, with probably the exception of Overman. The managers of the latter mine appear to be trying to do right by stockholders. They give mine and battery assays, and also more information regarding the work being done in the mine, than do the other companies.

The mining share market opened this (Thursday) morning active and fairly strong. After regular call they were slightly weaker, but under strong buying orders for Overman the market advanced and closed higher, particularly for the Gold Hills. The advance in Overman is due to a report that the assays are higher.

NEWSPAPER AGENTS WANTED.

Extra inducements will be offered for a few active canvassers who will give their whole attention (for a while at least) to soliciting subscriptions and advertisements for this journal and other first-class popular newspapers. Apply soon, or address this office, giving address, age, experience and reference. Special inducements to old agents.

DEWEY & Co., Publishers,
No. 220 Market St., S. F.

A new smelter is to be erected at Gregory, Dakota, to treat ore from the Silver city district.

ASTRONOMICAL SOCIETY.—By the courtesy of the Trustees of the California Academy of Sciences, all the San Francisco meetings of the Astronomical Society of the Pacific, during the next year, will be held in the lecture hall of the Academy's new building, 819 Market street. The annual meeting will be held Saturday at 8 o'clock P. M., and will be open to the public. The annual election of a Board of Directors and Committee on Publications will be held from 8:15 to 9 P. M. The following papers will be presented: "The Fireball in Raphael's 'Madonna di Foligno,'" by Prof. H. A. Newton, Yale University; "On the Similarity of Certain Orbits in the Zone of Asteroids" (second paper), by Prof. Kirkwood, Riverside; "Astronomical Observations in 1890," by Torvald Kohl, Denmark; address of retiring President of the society, by Prof. Holden, Mount Hamilton; "A Few Hints to Beginners in Solar Observations," by Miss E. Brown of England; "Lunar Work for Amateurs," by Thomas Gwyn Elger, F. R. A. S., of England; "The Total Solar Eclipse of January, 1899," by Prof. H. S. Pritchett, Washington University, St. Louis.

GRAVEL IN THE EXTENSION. A Downville dispatch dated March 24 says: "The people of Sierra county are jubilant at the discovery of gravel in the Bald Mountain Extension mine, about five or six miles from here. This find is over a mile from the mouth of the tunnel, and proves the existence of an extensive channel for miles up the Placerville ridge between Forest City and the Gold Lake country. At the Wide Awake mine near here rich gravel has just been found, and these two mines will benefit the entire county."

The combined cannery companies at the Karluk river, Alaska, have arranged for the establishment of a batobery for salmon during the coming season.

Assessment Notices.

CRESCENT MILL & MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Crescent Mill, Plumas County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on Friday, the 20th day of February, 1891, an assessment (No. 5) of Twenty-five cents (25c) per share was levied upon the Capital Stock of the Corporation, payable immediately in United States gold coin to the Secretary, at the office of the Company, No. 310 Pine Street, Room 40, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 6th day of April, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on MONDAY, the 4th day of May, 1891, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors,
J. H. ISHAM, Secretary,
Office, No. 310 Pine Street, Room 40, San Francisco, California.

DELINQUENT SALE NOTICE.

GRAY EAGLE MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Placer county, California. Notice—There are delinquent upon the following described stock, on account of Assessment (No. 22) levied on the 4th day of February, 1891, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Cert.	No. Shares.	Amt.
Barrows, A. W., Trustee.....	555	271	\$ 8 13
Francie, H. L., Trustee.....	444	1,500	45 00
Horton, T. B., Trustee.....	585	2,500	75 00
Lane, Mrs. Sarah, Trustee.....	365	200	6 00
Stout, C. S., Trustee.....	477	953	28 50
Searles, W. A., Trustee.....	518	1,000	30 00

And in accordance with law, and an order of the Board of Directors, made on the 4th day of February, 1891, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, Room 11, No. 303 California street, San Francisco, California, on MONDAY, the 30th day of March, 1891, at the hour of one (1) o'clock P. M. of said day, to pay said delinquent assessment thereon, together with costs of advertising and expenses of the sale.

A. W. BARROWS, Secretary pro tem.
Office, Room 11, No. 303 California street, San Francisco, California.

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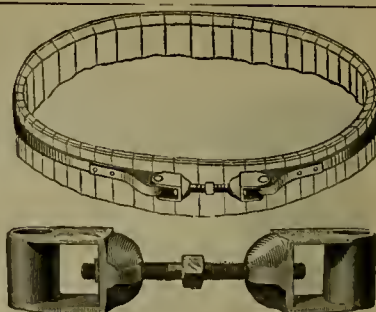
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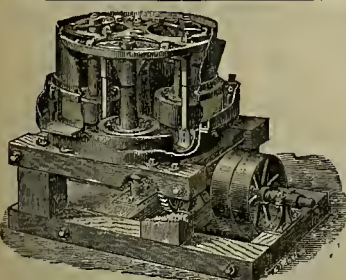
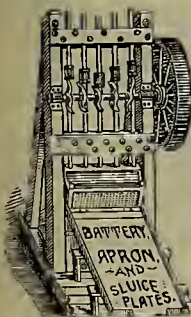
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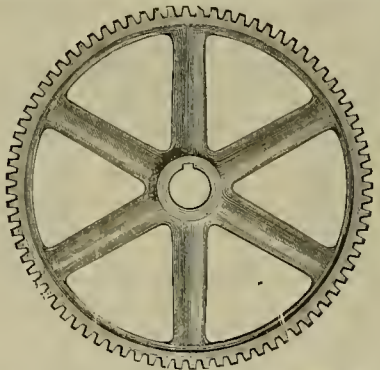
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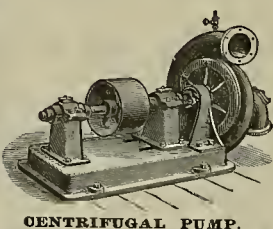
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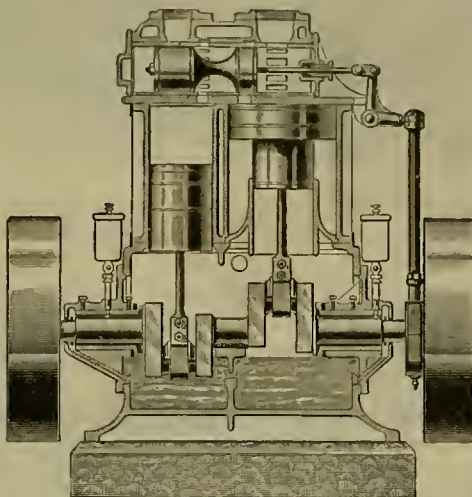
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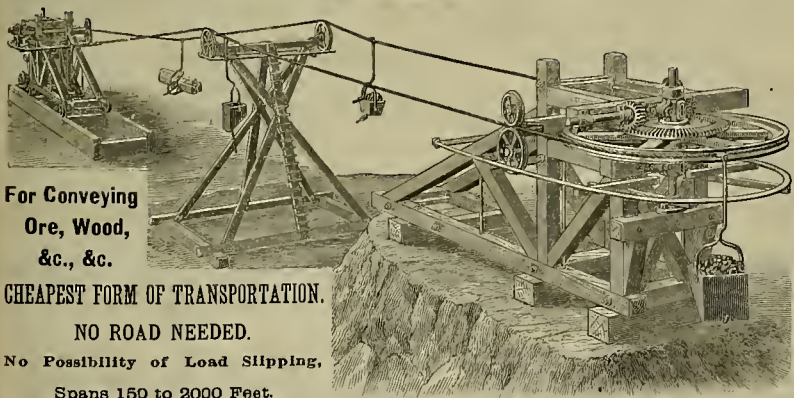
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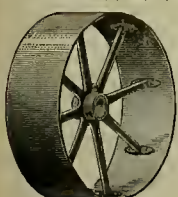
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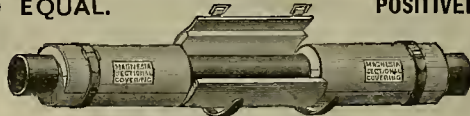
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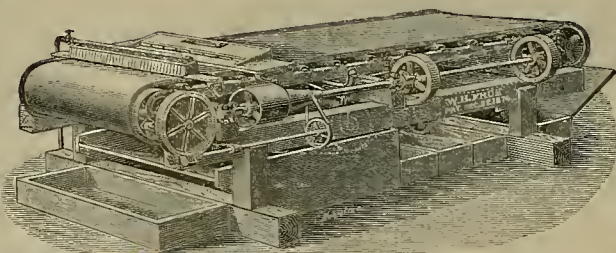
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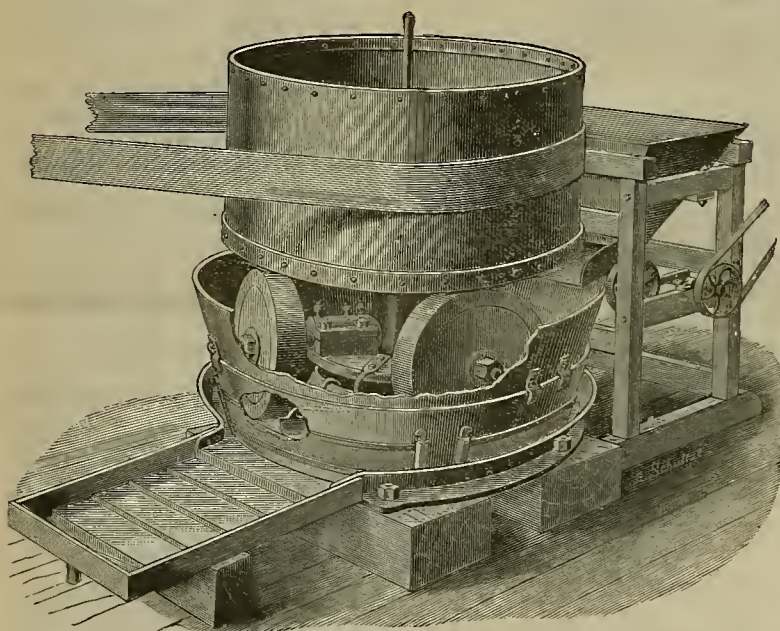
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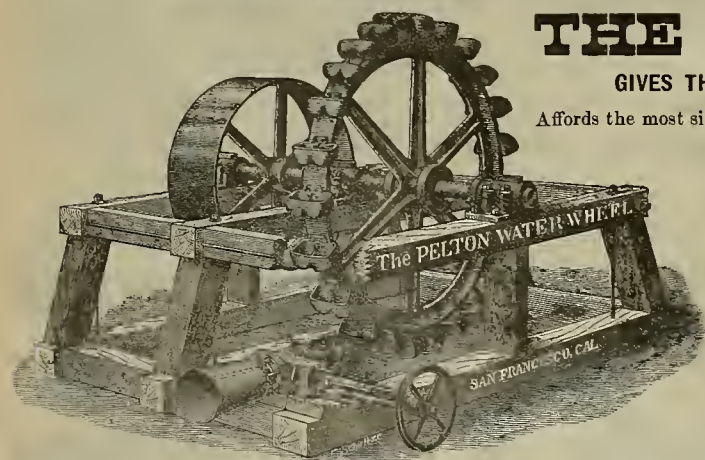
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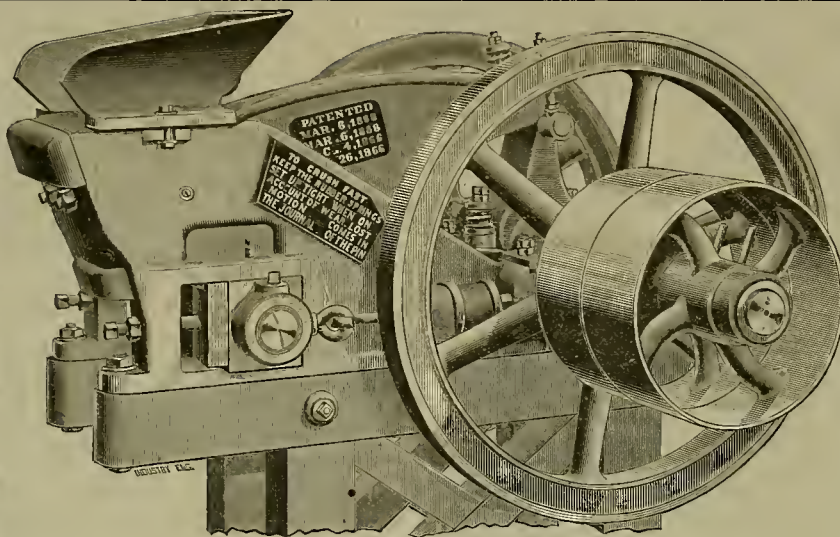
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"Fault Scarps."

Salt Lake City is built just south of a spur which projects four or five miles westward from the front of the Wasatch. This spur is separated from the mountain mass by a fanit plane along which the Wasatch block has, relatively speaking, risen, and it is separated from the valley on the remaining three sides by a curved fault plane along which the block underlying the valley has, relatively speaking, fallen. The first of these faults was determined from the rock structure by Prof. J. E. Clayton, of Salt Lake City. It is also indicated at its northern end by a fault scarp which can be traced for a short distance up the groin. The fault on the side of the valley is exhibited at the west and northwest by a series of scarps, which begin in the northern suburbs of Salt Lake City near Warm Springs. The surface of the plane below is thrown by the same faulting into irregular waves and at one point it is distinctly terraced. On one of the faulted benches an ore-reducing establishment has been built, using the lower bench as a dumping ground for its slag. Between the point and the hot spring an alluvial cone built against the face of the spur is traversed by a typical scarp, which has been sketched by Mr. Holmes and figured the



ROCK BREAKER FOR FINE CRUSHING.—See page 216.

"Lake Bonneville" of Gilbert of the United States Geological Survey.

The sketch is herewith reproduced, where may be seen not only the scarp but its relation to other elements of the local geological history. The face of the spur consists of a

paleozoic limestone, inclined at various high angles. The horizontal terraces it bears are shore marks of the ancient lake.

The portion of the alluvial cone that lies above the fanit scarp is channeled by a stream, and a study of the system of terraces bordering

this channel shows that the total displacement of 30 feet was produced by at least three independent movements, the measures of the parts being 15 feet, 5 feet and 10 feet. At this point and elsewhere in the vicinity the scarp is utilized by the burners of lime, who construct these kilns against its face and use the terraces above and below for the two approaches needed in the management of the kilns. The proprietor of the kiln represented in the plate enjoys the further convenience of quarrying his limestone from the adjacent cliff.

The hot spring at the apex of the spur is on the line of the fault, and a scarp can be traced from it in either direction. The powder-houses standing a little farther northward are partly above and partly below the fault scarp. Many of the fault features of this vicinity, including those figured in the plate, may be seen from the car windows of trains passing between Salt Lake City and Ogden.

THE mines of Butte and Anaconda are having serious trouble with the Montana Union R. R., growing out of the transportation rates for hauling ore, fuel and supplies. The furnaces at the Anaconda have been shut down, and it looks as if it might take several months to settle the difficulty.

WE received at this port, during the past week, 42,000 tons of coal.



FAULT SCARP CROSSING ALLUVIAL CONE, NEAR SALT LAKE CITY.

CORRESPONDENCE.

We admit, undorsed, opinions of correspondents.—Eds.

Reno, Nevada and Vicinity.

EDITORS PRESS:—During a recent visit to Reno, I gleaned a few facts from some of her citizens that may be worthy of notice. While not the metropolis of Nevada, being outranked in both age and population by Virginia City, it is generally conceded to have more elements of substantial prosperity than any other town in the State. It is pleasantly situated on the Truckee river at the northwestern edge of the famous Truckee meadows, a fertile and productive basin, moderately estimated at 225,000 acres of arable soil. Four-fifths of this extent, it is safe to assert, is devoted to pasturage and the production of hay. Though all kinds of cereals, vegetables and hardy fruits are congenial, no attempt has scarcely been made to produce them for export, it having generally been considered less remunerative than hay, which has usually found a ready sale at a high price. For hundreds of miles north, east and south of here, beef cattle are annually collected at this point and fed during winter months on the alfalfa hay of the meadows, and shipped as required to the California market.

At this place reside a number of the prominent stockmen of the State, the town affording ample educational and social advantages for families. Geo. W. Mapes, who bears the distinction of being the Cattle King of Nevada, and owning large herds in Northern California and Oregon as well, is one of the public-spirited men of the place. Shespe as well as cattle owners rejoice over their success during the past year. While the year 89-90 proved the most ruinous in the loss of live stock since the country was occupied by white men, the last winter was about the lightest ever known. All stockmen I met reported alike: "No loss this year, and still in nearly as good condition as in the fall."

The Riverside Flour Mill of Reno bears a good reputation for the quality of its manufacture. Its capacity is 100 hhls. per day. From Mr. H. H. Beck, the superintendent I learned to my surprise that Washoe county produced for market only 350 tons of wheat last year. This gentleman has made a close calculation (and from his long and intimate acquaintance with the country his estimate should be reliable) and aims up that the Truckee Basin is capable of furnishing breadstuff for the entire State. At present the Riverside Mill gets most of her grain from Californians, a small proportion coming from the Lovelock settlement on the Humboldt and from Honey Lake, also from Salt Lake Valley. It is Mr. Beck's opinion that farmers here would enhance their gains to devote more attention to wheat-growing as they would almost find here a ready home cash market at \$8 per ton more than their California neighbors—that being the cost of importing grain by S. P. R. R. Reno has been unfortunately in losses sustained by fires from time to time, Riverside mill being the fifth and only mill now standing. The fire of two years ago has still left its mark, though the district has been partially rebuilt with substantial brick houses. Two causes seem to conspire in effectually preventing Reno from making the advancement which her position and other elements of prosperity would promise. Business men claim that the S. P. R. R. Co. have discriminated against Reno on freight charges, very materially for years, out of spite for having been compelled to pay their taxes to Washoe county. Another cause why capital and population seek other fields is said to be the high taxation imposed in Nevada in order to enjoy the luxury of a State government.

Reno has good transportation facilities, the overland S. P. R. R. from east to west, the V. & T. leading south and the N. O. C. R. R. north. The Truckee river affords an unailing supply of the finest water for every use, including mill power and for irrigation. A number of enterprising men here are investing capital for the advancement of irrigation schemes on a large scale. The town has a population of 4000. Its altitude is 4500 feet. For healthfulness it has very few rivals. Its claims in this respect are recognized substantially in different ways, one of which is in having established the best schools, both public and private, in the State, including the State University. I had the pleasure of visiting this institution, of which Prof. S. A. Jones is the president. It was established at Elko in '77 and removed to Reno in '83. The attendance is reported on the increase, there being 60 students at present and ten instructors.

The various secret and benevolent Orders and choroeas appear to be well represented. The streets are lighted at night by electricity, and there is apparently an air of thrift and comfort about most of the homes, notwithstanding the mormor of dull times is occasionally heard.

Adjoining the asylum, you are confronted with a species of political jobbery which was put through the Legislature in '83. The stone walls for a penitentiary, in a useless and a half-completed state, mock the honest taxpayers who were jilted out of \$100,000. It is still believed, however, that the penitentiary will eventually be voted here from Carson City, and that in such case the present waste will not be all a waste.

F. B. L.

California School Lands.

EDITORS PRESS:—It seems that the State has various tracts of school lands for sale; is there no law or authority for advertising them, giving the location, description section, township, etc. As it is now, if a person desires to purchase a tract of school land, he is compelled to pay some land shark or land attorney a high price just to tell him where such land is located, which information he has secured from the State land office. I am informed that land companies send parties out to survey, photograph and locate the more choice tracts of land, and then hold the land for high commission for the information secured. I suppose they have the right to do this, but it seems that the State might spend some of the tax payers' money in giving notice to the public where these lands are located, as well as to appropriate money for portraits, of each succeeding Governor of this State, that the masses of the people never see and have no use for.

San Jose.

W. T. EDDY,

EDITORS PRESS:—There is no law authorizing the advertising of school lands. Each and every citizen of the State can get as full and complete information at the land or surveyor's office, Sacramento, regarding the lands, as is possessed by the officials in charge. Locations and surveys, together with field notes, can be had of lands which are not sold or filed on; but even with this knowledge, unless the would-be purchaser goes in person or sends a responsible agent to examine the land, he takes great chances in getting that which is not to his liking. Of necessity, to obtain personal knowledge or information through a trusted agent takes time and costs money. Aside from this, while securing or waiting for desired knowledge regarding the land, it is liable to be filed on by another person. It is the cost of getting this information, through trusted agents, that we are informed school land agents charge to purchasers, when either locating or selling these school lands.

The writer's canvass among those who have sold, and also those who have bought school lands, has resulted in giving him much valuable information, which briefly stated is as follows: The school lands were set apart by the United States to the State, for the benefit of the public schools, the proceeds received from their sale by the State going to the school fund. They comprise the 16th and 36th sections of each township, or the lands selected by the State in lieu. These lands are sold in tracts of from 40 to 640 acres. Residence on, or improvement of, the land is not necessarily required. The title to school lands comes from the State direct to the purchaser, and is based on patent to the State from the United States. The terms of payment are much easier than on any other cheap lands offered.

The school lands are well culled, yet it is said that in some of the northern counties good sections of rolling and plateau lands can be found, and as the localities are settled up, better railroad and shipping facilities are among the possibilities within the next five years. It is said that some prairie lands are offered in the southern part of the State. These lands have heretofore been classed as arid, but under our irrigation system and developments made in the various counties where located, they have fully demonstrated their productiveness. Railroad construction is very active in this part of the State. In the coast and central counties, it is said that there are to be had some choice hill and mountain lands. Many of the most flourishing and best paying hill or mountain orchards were at one time uninviting chaparral-covered lands.

Aside from farming lands there are timber lands, for which, owing to their growing scarcity, there is an increasing inquiry. This demand is probably intensified by reason of the last Congress passing a law withdrawing Government timber land from market.

In connection with the above, the following from ex Governor R. W. Waterman's message to the 28th Legislature of this State is of interest: "While California has been selling her school lands at an absurdly low price, Michigan has been realizing over \$5 per acre; Indiana, about \$4 per acre; Illinois, about \$4 per acre; Ohio, over \$5.50 per acre; Colorado, from \$3 to \$50 per acre; Nebraska, not less than \$7 per acre, for land obtained under the same grant, while in Minnesota \$5 per acre is the minimum price, and she has sold 1,000,000 acres of her school lands at an average of \$6 per acre. In Kansas, school lands are sold after appraisement, the minimum price being \$3 per acre.

"Immigration is large, lands are rapidly increasing in value, and Section 3494 of the Political Code should be so amended that our remaining school lands be sold for a price commensurate with their value, made subservient to the purpose for which they were donated, and legislation enacted from the standpoint of finance—revenue being their sole object."

J. R. F.

The Death Valley Find.

EDITORS PRESS:—A man named Montgomery who has been for the past three months prospecting in Death Valley, has departed for San Francisco with a valise full of the finest specimens that could be seen. They are from a new find 20 miles west by north from Winters' ranch Death Valley, Nevada. It is said that a large ledge 12 feet thick located along the line for some eight miles has been found, and that the quartz at the point where the specimens came from is literally hung together with gold. It excited a certain class of people

of this place (Daggett) and of Osioo and many teams with prospecting parties have left for the new find. Since that, other parties from San Francisco have arrived here and three more teams have left with still more to go. Four men are now said to be standing guard over three of the locations. There is said to be timber and water in plenty for quartz milling purposes. They have great hopes that this is at last the famous Breyfogle or Lost mine for which many people have hunted for years. They say that the ledge has opened in 20 places and has really been known for a month, but they have kept quiet about the find. It is expected that a great rush of "solitaries" will flock in now when it is too late to get anything; and that bee-hunters and pumpkin rollers will expect to get rich right off. This find is at a distance of 150 miles from here on the Atlantic and Pacific road, but I give you this account as reliable as I could get it.

S. P. BLADE.

Daggett San Bernardino Co.

The Duty on Coal.

Alfred Bannister, the vice-president and general manager of the Starr Milling Company of this city, has written a brief "suggestion" for the benefit of California farmers and millers, which will be presented to the Produce Exchange and the Chamber of Commerce. He declares that our farmers now labor under the disadvantage that our population is too small to consume sufficient imports to bring here the tonnage required for the export to Europe of the wheat surplus. Mr. Bannister's suggestion is as follows:

"That the State of California should refund to all importers of coal from Europe and the Australian colonies the import duty of 75 cents per ton at present charged.

"It is not proposed to make this refund on coal from British Columbia, which is brought here in vessels chartered for the export of wheat hence to Europe.

"Coal being bulky and of great weight compared to its moderate value financially, already brings more tonnage fit for exportation of wheat to our coast than all other imports combined. The adoption of the above suggestion would as surely bring us considerably more tonnage than now to export our wheat, as this increase of tonnage would reduce wheat freights hence to Europe. This reduction of freights would enable shippers to pay more than now by \$1 to \$2 per ton for wheat to farmers, who would also be further benefited by the greater value given to their land through this increasing its earning power.

"No doubt this proposed action would slightly prejudice our few coal producers, but it would, without doubt, very considerably benefit (1) our most deserving 50,000 farmers; (2) our steamship, railroad and gas companies; (3) our growing home industries, and (4) every householder and consumer of coal."

Mr. Bannister declares that neither his company nor himself ever import coal, so that his sole motive in making his suggestion is the welfare of the State and of its farmers.

Treasury Regulation About Ores.

Attention has been called to the probability of certain frauds being perpetrated in imports of lead ore to this port. There was reason to believe that the foreign shippers in some instances endeavored to smuggle lead into this port by capping the sacks with a covering of silver ore upon which there is no duty. The Acting Secretary of the Treasury, A. B. Nettleton, has covered certain phases of the fraud in a circular received at the collector's office. It recites that Article 9 of the Department Circular No. 4 of January 8, 1891, relative to the smelting and refining of imported ores and crude metals in bond, has been amended as follows:

"In case the operation of smelting and refining cannot be carried on in a single establishment, the bonded warehouse shall be designated as a smelting warehouse, and the unrefined products or hulkion obtained from the smelting of crude metals or ores in such warehouse may be removed therefrom for shipment to any refining works upon the payment of the duties on the quantity of crude metal or ore contained in the imported mass used in the smelting, or upon the production of a certificate from a collector of customs at a seahoard port, stating that a quantity of dutiable refined metal equal to 90 per cent of the quantity indicated by the original assay has been actually exported by the owners of the bonded smelting warehouse or their agents, and that the metal so exported was shown by evidence satisfactory to the collector to have been produced in their bonded warehouse, wholly or in part from imported ore or crude metal."

MUCH MORE BULLION.—The production of gold in the United States, according to the official estimate of the United States Mint, is \$64,000,000 for 1889 and 1890. Besides this, not less than \$1,000,000 of foreign gold coin is brought into this country by foreign immigrants, which is not taken into any official statistics of imports. The total net exports of gold for two years amount to \$41,584,000. From these figures it will be seen that, unless the official statistics of the Government are entirely worthless, there has been an increase of gold in the form of bullion or coin to the approximate amount of \$23,500,000 in the last two years.

Treatment of Iron-Coated Gold.

A writer in the *Anstralian Mining Standard* in speaking of the Pambula gold-fields, has the following to say:

This comparatively new gold-field is rapidly coming to the front, recent developments tending to show that these mines will prove very valuable. The way in which the precious metal has been deposited in the lodes is in a measure unique, and it is beyond a doubt that the ordinary methods will fall to solve the extremely finely divided gold these lodes contain. Several parcels of ore have been treated in Sydney by the method of wet crushing and amalgamation, the yield of gold fully proving the richness of the ore, though the loss of gold in that method of treatment is large, especially in the poorer sorts, in which it is estimated that 30 to 70 per cent is lost. This great loss arises from two causes: First, from the very finely divided state of the gold, which is known as "float" or "float" gold; the second is from the fact that, like some of the gold in the Mt. Morgan ore, it is coated with a film of iron which prevents the gold coming into contact with the quicksilver, and if not saved in the concentrates, it is lost in the tailings. It is known that if tailings contain 5 dwt of free gold to the ton, the gold can be seen with a moderately powerful glass; but if coated as above, its presence cannot be detected even in very rich concentrates. Recently a parcel of some ten tons of rich stone from Pambula was treated by wet crushing and amalgamation, the operation being performed in Sydney with great care. The result, we are informed, was 164 oz. 2 dwt. of retorted gold; the concentrates weighed 256 lbs., which assayed at the rate of 186 oz. to the ton, representing a money value of about £785 per ton of concentrates, or £9 per ton of ore. Notwithstanding the rich character of these concentrates, the gold they contained was not visible under a powerful glass, thus showing that the gold was concealed by a film of iron.

The tailings assayed 3 oz. 18 dwt of fine gold, say £16 in money value per ton of tailings. To recapitulate: The value of gold saved per ton of ore is, say, £60; value of gold in concentrates, £9 per ton of ore; value of gold in the waste, £16 per ton of ore. Thus the total of gold in concentrates and tailings is about £25 per ton, or, in round numbers, £250 worth of gold in the 10 tons referred to, which could not be saved by the ordinary process. Dry crushing and obloration will and has saved 96 to 98 per cent of all the gold in the ore. A parcel of two tons of ore from another lode at Pambula was recently received in Sydney. One ton was treated by wet crushing and amalgamation; the other ton by obloration. The assay value of the ore was under 2 oz. per ton. There was no choice between the two lots. That by obloration resulted in saving 97½ per cent of the gold. It was dry crushed, and when placed in the air-tight cylinders, there was no chance for any of the gold to escape. Compared with the other method, obloration secured three times more than was saved by wet crushing and amalgamation. Bearing on the question of iron-coated gold, and on the fact that it will not in that condition amalgamate with quicksilver, we publish the following extract from the report of a lecture by Dr. Leihus, assayer to the Mint, on the occurrence of a similar difficulty with regard to Queensland ore:

Having now shortly described the remarkable occurrence and purity of this Mt. Morgan gold, a not less interesting though less satisfactory fact is this—that only about half the gold is extracted by the ordinary quartz crushing and amalgamating machinery. Having the small quartz-crushing machinery erected at the Sydney Mint under my charge, I have had an opportunity of testing this fact. We received, through Mr. Hall of Sidney 458 lbs. of this ferruginous quartz, part of it consisting of pitted stone. It was carefully crushed and amalgamated in the Chilian mill, with 240 lbs. of mercury. Thus seven 44-100 oz. of gold, assaying 991.5 were extracted. Another lot weighing 174 lbs. was similarly treated, and 12 12-100 oz. of gold extracted, assaying 998.2. Thus Lot 1 gave gold at the rate of 39 32-100 ozs. standard per ton of quartz. In Lot 1 gold at the rate of 46 ozs. 2 dwt. 12 grs. per ton was left in the tailings; while in Lot 2 the tailings assayed 64 ozs. 5 dwt. 18 grs. of gold per ton. Both lots of tailings were now mixed and passed for two hours in the Chilian mill with 240 lbs. clean retorted mercury—only 13 ozs. of gold assaying .981 were, however, obtained by this treatment. The tailings were dried and found to weigh 476 lbs., containing gold at the rate of 41 ozs. 13 dwt. 16 grs. per ton; or in above 476 lbs. tailings no less than 8 ozs. 17 dwt. 3 grs. gold. I have brought some of the tailings here. Under the microscope there is no gold visible. That the ordinary amalgamating Chilian mill did not extract all the gold in this stone I can only attribute to the supposition that the oxide of iron has literally coated some of the fine gold, thus preventing it from coming in contact with the mercury. For another ore, Plattner's chlorination process, if worked on a large scale, ought to be highly successful. I am glad to bear that arrangements have been made by which the tailings will presently be treated at the mine by the chlorination process, whereby the gold is dissolved by an aqueous solution of chlorine gas, and precipitated by hydro-sulphuric acid.

Hydraulic Mining.

Unity of Action Demanded.

Alf Trudger, a prominent miner of Nevada county, writes to the *Nevada Transcript* as follows:

I have been a constant reader of your paper for the last seven years, during which time I have often read therein articles on farming and hydraulic mining; and often have I seen whole columns copied from the representative valley papers most unfavorable to that branch of the mining industry; and I am sorry to say that from the tone of the *Sacramento Bee* and the *Marysville Appeal's* articles (which papers are undoubtedly the mouthpieces of the Anti-Dam Association), the miner is looked upon as anything but the generous, whole-souled being that he really is. Poor fellow! How fortunate he was born a gaudier, when so many who subsist on his labors are so anxious to "kill the goose that lays the golden egg." I wonder if it ever occurred to our valley friends to go back to first principles and ask themselves how it was that our glorious country achieved her independence? To such question there is but one answer—by unity! The farmers are united. So were the soldiers in the days of yore; but while they did the fighting, others supplied the wherewith to clothe, to feed. If they all had not taken an interest in national affairs, where would our country have been to-day? And while the vocation of one was to protect, the ambition of the other was to keep alive the protector. How matters have changed. No sooner is it known that you are a benefactor than envy becomes rampant and will not be satisfied until your very existence is "wiped out." Such has been the fate of hydraulic mining. Here is the former waging war against the miner to the detriment of both. What does the farmer work for? Gold. What does the miner work for? Gold. Then why not let them unite and obtain it? If it is not done in our generation, it will be in the next, and if we do not embrace the opportunity, we have ourselves to blame for it. In Nevada county alone, there are hundreds of millions in gold known to exist in the gravel deposits that have been already discovered and thoroughly tested.

In the United States Treasury at Washington there are hundreds of millions lying idle that have been extracted by the miner and turned into specie. Why not let a little of that which is lying idle be appropriated to the good cause of obtaining more, especially when you know exactly where to get it from? Do you not think that it is a disgrace to the present state of so-called advanced civilization that localities where so much gold is known to exist are permitted to lie idle, and the gold to remain there without any attempt being made to extract it? Do you not think there are brains enough on the Pacific Coast to devise a means and carry it into execution if the wherewith were forthcoming whereby this gold could be extracted from the gravel without injury to the farmer? Do you not think that if the miner and the farmer became a "unit," both realizing the vast benefit that they would each derive, from the fact that so much more gold was to be put in circulation for the avowed purpose of producing more, that they could prevail upon their representatives in the Legislature to unanimously vote in favor of a liberal appropriation from the National Treasury? Do you not think that all the States and Territories on the Pacific Coast would assist California and so instruct their representatives to the national capitol? Then with a unanimous voice from the Pacific Coast, could not an appropriation be obtained from Washington? What is money? Is it not mineral? How came it to be locked up in the Treasury vaults at Washington? It gradually accumulated there, but it came first of all from the mines. The majority of the gold is from California and the silver from Nevada, Arizona and Utah, and the more of it the miner produces the more is the real value of the United States enhanced. No matter what business you are engaged in, aside from mining, the basis of it is the gold and silver that have been produced by the miner, and the miner of to-day who produces more is a universal benefactor, an honor to the State and a blessing to the community. We live in a land where there is unlimited gold. The pioneers have but shown us where to dig for it and the native and adopted sons should not be slow in extracting it. All those who are not workers in the field should at least encourage those who are, and do all in their power to assist in uncovering the gold that lies under our feet and placing it on the surface for the benefit of mankind. The necessary appropriation being once obtained to use it to advantage would be a secondary consideration. Efficient dams could be placed at the mouths of those rivers which empty into the Sacramento river. A flume sufficiently large could be so constructed as to enable dredgers to elevate the alluvium from behind the dams into the flume and carry it down on to the tilled lands, and so make farms. This flume could be constructed with rifles in the bottom and be cleaned up occasionally. Considerable gold would be found there. All mining companies which availed themselves of these improvements would be only too willing to pay a per centage to keep the dredgers and the flume in repair. Only if it is executed at all, let it be done on a large scale. If two dredgers won't keep away the silt, one put on twenty so all the mines can work. That is progression. It may cost considerable money, but then the money is not being buried, it is

merely circulating. The object of the circulation is future production. In California, we ought to produce \$50,000,000 in gold annually, and that can be achieved in time if we but go back to first principles—unity—and live up to them.

State Appropriations for the Fair.

Bills have been presented in the Legislature of the various States and Territories as follows, for appropriation to the World's Fair at Chicago:

Alabama	\$30,000
California	300,000
Connecticut	25,000
Colorado	150,000
Idaho	20,000
Illinois	1,000,000
Indiana	75,000
Iowa	50,000
Kansas	50,000
Maine	40,000
Massachusetts	75,000
Minnesota	100,000
Missouri	100,000
Montana	100,000
Nebraska	150,000
Nevada	20,000
New Jersey	20,000
New York	250,000
North Carolina	25,000
North Dakota	25,000
Ohio	100,000
Oregon	100,000
Pennsylvania	300,000
Texas	300,000
Vermont	5,000
Washington	240,000
West Virginia	40,000
Wisconsin	250,000
Wyoming	30,000
New Mexico	25,000
Oklahoma	7,000
Total	\$4,002,000

Bills have been introduced in the following Legislatures and entirely failed:

Arkansas	\$100,000
South Dakota	25,000

Total. \$125,000

Both houses in these two States voted against the bills and refused any appropriations.

In the following States the World's Fair appropriation bills have been passed by both houses of their Legislatures and been signed by the Governors and are in force:

California	\$300,000
Idaho	25,000
Indiana	75,000
Iowa	50,000
Montana	100,000
New Mexico	25,000
North Carolina	25,000
Oklahoma	7,000
Oregon	100,000
Pennsylvania	150,000
Vermont	5,000
Washington	100,000
West Virginia	50,000
Total	\$1,007,000

HUGE CHUNKS OF METAL.—When excavations were made recently for the foundation of the 20 story Masonic Temple, which is rapidly going up at the corner of State and Randolph streets in Chicago, an 18-ton mass of iron, copper and other metals was discovered. A wholesale hardware store stood on the lot at the time of the great conflagration of 1871, and this mass of iron represents a portion of the stock which was melted by the intense heat and precipitated into the sub-basement. It will be exhibited at the World's Columbian Exposition by D. A. Stout, The Copper Queen Company, at Bisbee, A. T., will exhibit at the fair a mammoth specimen of ore from their mines. The work of chiseling the piece out has been going on for some time, and great care is being taken in its extraction. It is estimated that when ready for shipment it will weigh five tons and will be in the shape of a brick. The specimen is from the big stoep from which such beautiful specimens have been taken, and will contain about every known character of copper formations and colorings. It will, without doubt, be the most attractive specimen on exhibition.

NEW GOLD FIELDS.—George Ladd arrived in Winnemucca this morning from the new gold fields northeast from Disaster Peak. Mr. Ladd left Lovelocks some time in the forepart of February and has been prospecting on Kluge River and Horse Creek ever since. He brought in a small vial of fine-looking gold, some scales weighing as much as 50 cents. He claims that the ground on Horse Creek, where they sunk their shaft, will yield from one cent to 50 cents to the pan. In one pan they obtained as high as 75 cents. Ladd should be a very good judge of the weight of gold, as he has been in the neighborhood of the Spring Valley mines for years, and has carried probably \$100,000 or more from those mines to Lovelocks for the Chinamen. He is in after lumber for sluiceways and other material and provisions. There are four of them in the company, the balance remaining at the find until Mr. Ladd returns. It has been known for years that the King River country contained gold, but until recently there has been no excitement about them.—*Silver State (Nev.)*

A TIN-PLATE MILL.—The St. Louis Stamp Company has inaugurated the actual work of erecting the first tin-plate works in this country, near their present rolling-mills. The iron now used by the company in the manufacture of plates comes from Tennessee, but it is proposed to establish a mammoth steel-mill and iron foundry just north of Madison, Ill., to turn out all the sheets used in the manufacture of tin plate.

Ramie Culture.

A French professor expresses great confidence in the future of ramie culture in France. He thinks it will be the means of delivering that country from its present heavy obligations to other countries for textile materials. Whatever we of California may think of these conclusions, we cannot but note with interest the hopefulness of the ramie industry in a country where both its cultivation and manufacture have made most important progress during the comparatively short time of but little over a single decade.

Commencing with its cultivation only, it soon began to take a prominent place among the manufacturing industries of that thrifty people. Starting without any aid from Government, it soon arrested the attention of government officials to such an extent as to induce them to speak encouraging words for it. Experiments were also ordered for the purpose of ascertaining its relative excellence, as compared with other fibers. One series of these experiments in comparison with Russian hemp showed the breaking weight of same to be from 125 to 150 as compared with 80 for Russian hemp. Another series of experiments made in regard to its traction capacities with hemp, flax, silk and cotton were found to be represented by the figures 100, 36, 25, 13, 12, respectively. The elasticity of the same fibers stood 100, 75, 66, 400, 100. Several other carefully conducted experiments were also made, in all of which, ramie held the first position with large odds in its favor.

A very important property of ramie for the manufacture of oordage and sail cloth was found to exist in its incomparable power for resisting the action of damp atmosphere and water.

There is no fiber known which is capable of being wrought into such a variety of useful fabrics as ramie. Samples have been shown in this city of every class of goods for both male and female wear, from the coarsest and cheapest which can be utilized up to fabrics which bear almost undistinguishable likeness to the best Lyons silk, or such as will not suffer in comparison with the finest Chantilly lace.

Until within a few years manufacturers have been compelled to rely mostly upon the slow and tedious though cheap process of hand decortication, as practiced in India; but recently most effective machine decorticators have come into use which are able to do the work quite as well and cheaper than the same work can be done by the ten-cent-a-day laborers of India. By the aid of these machines there need be no lack of the raw material for our factories wherever or whenever they might be established.

Several of these machines have been introduced into California, one of which was shown at work at the last Mechanics' exhibition in this city, which appears to answer all the demands that can be asked for such work. In all other portions of the world where ramie decortication has been introduced, it has been worked in a state more or less green or damp, and resort has to be made to some chemical process to remove the gummy substance which always adheres to the fiber. It has been found, however, that the dry climate of California so effectually removes the moisture from this gum and renders it so brittle that it is sufficiently removed in the form of fine dust by the action of the decorticator to place the fiber in a marketable condition without the use of chemicals. This is a very great advantage, saves much cost and largely adds to the advantage which the California grower will have over growers in other and less favorable climates.

Considering all these facts, and especially this last-named advantage, it would seem to behoove California farmers to carefully consider the importance of this new and promising industry. Experiments made under the auspices of our State University, as well as by many practical farmers in various portions of the State, have fully shown the admirable adaptability of this State for the cultivation of the ramie.

A bill appropriating \$10,000 for the encouragement of ramie planting in this State has passed both branches of the Legislature—the Senate by a unanimous vote—and will, no doubt, receive the signature of the Governor.

TESTING THE SILVER COINAGE LAW.—The silver-brick matter has been renewed, a petition being filed in the Supreme Court of the District of Columbia in behalf of George G. Merriam and associates, praying for a mandamus on Secretary Foster to compel him to receive the silver bar for free coinage.

ANOTHER RICH STRIKE.—It is reported that a rich strike has been made in the Lakeview mine at Lundy—\$250 gold ore, and lots of it. The Lakeview is one of the syndicate of mines recently sold to Chicago parties, and of which R. T. Pierce is superintendent.—*Bridgeport Chronicle-Union.*

The inventor of the Maxim gun is devoting his attention to flying machines. He makes the somewhat astounding statement that he has obtained one-horse power from a motor weighing only six pounds, and that this will support 135 pounds in the air.

An Improved Fuse-Cap Fastener.

Mr. N. W. Moody of Fresno, Fresno county, Cal., has recently patented a device which is especially designed as an improved implement for fastening the caps on fuse employed in exploding giant powder. The pliers are formed of two similar parts, connected by the pivotal rivet, each part having a cheek with notches, at the sides of which are cutting edges for cutting the fuse. The curved jaws beyond the cheek pieces, when closed, form a circular aperture, around which the jaws are beveled, one jaw having a tongue which fits in a groove in the other jaw. The pliers are employed for contracting the end of the cap on the fuse firmly and absolutely water-tight, thus avoiding the dangerous operation of digging out wet and unexploded loads. Miners who have used implements of this class will appreciate the improvements in the one designed by Mr. Moody. The instrument crimps the cap on the end of the fuse firmly. The fuse-cutter is simple and efficient. This implement is neatly gotten up of the finest cast steel and nickel plated. It is small and light but strong and well adapted for its purpose.

It is well known that numbers of miners are killed annually in the United States and elsewhere while going through the dangerous operation of digging out wet and unexploded loads, to say nothing of those losing an eye or a limb in the same way. Accidents of this nature could be avoided, and the handling of Giant Powder made comparatively safe, by the use of an instrument such as this invented by Mr. Moody. Mining companies would also relieve themselves from the liability of damage suits were the use of such an instrument adopted by them. Another item of interest and benefit to mining companies is the time saved in preparing the cap and fuse for use. Instead of taking time to use soap and a string or tar, after the usual effort to fasten the cap to the fuse, this implement enables the miner to cut the fuse and fasten the cap on firmly, and absolutely water-tight; and this is done in a few seconds, which means no loss of time at all. Any one familiar with blasting operations can appreciate the advantages of this implement.

The New Vagrant Law.

The Senate bill defining vagrancy and punishment has been signed by the Governor. It provides that the following classes of persons shall be deemed vagrants, and when arrested shall be punished for misdemeanor: First—Every person, except a California Indian, without visible means of living, who has the physical ability to work and who does not seek employment nor labor when employment is offered him; or, second, every healthy beggar who solicits alms as a business; or, third, every person who roams about from place to place without any lawful business; or, fourth, every person known to be a pickpocket, thief, burglar or confidence operator, either by his own confession or by his having been convicted of either of said offenses, and having no visible or lawful means of support, when found loitering around any steamboat landing, railroad depot, banking institution, broker's office, place of public amusement, auction-room, store, shop, or crowded thoroughfare, or on omnibus, or at any public gathering or assembly; or, fifth, every idle or dissolute person, or associate of known thieves, who wanders about the streets at unusual hours of the night; or, sixth, every person who lodges in any barn, shed, shop, out-house, vessel, or place other than such as is kept for lodging purposes, without the permission of the owner or party entitled to the possession thereof; or, seventh, every lewd or dissolute person who lives in and about houses of ill-fame; or, eighth, every person who acts as a runner or capper for attorneys in and about police courts or city prisons, in incorporated cities or cities and counties; or, ninth, every common prostitute and common drunkard is a vagrant and is punishable by imprisonment in the county jail for not exceeding six months.

OIL HARDENED STEEL PLATES.—Messrs. Brown and Messrs. Cammell, the two great Sheffield firms, have recently been making some experiments on the effects of oil-hardening and annealing. A nine inch plate of steel was cut into two plates, each four feet square. One piece was left untreated and the other oil-hardened and annealed. They were fired at by the six inch gun with Firth steel projectiles weighing 100 pounds. The striking energy of the blow upon the untreated plate was 2389 foot tons, and the energy of the blow upon that which had been treated was 2378.5 foot tons. It is reported that in the latter case the projectile made an indentation of 10½ inches, so that light was just visible through the center of the hole at the back of the plate. The projectile rebounded broken into three pieces. The plate was cracked through, but was whole, and no material was splintered out either at its front or back. In the case of the untreated plate, the shot passed through, and the splintering of the steel around the hole in front of the plate spread over a space of 15 inches across. The splintering around the hole at the back of the plate covered a space of 31 inches across. The plate did not remain whole, but went into six pieces.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

BELL WETHER.—We made a visit to this claim this week. A substantial building has been erected over the shaft, with a small blacksmith shop attached. The sinking operations make slow progress, as the shaft is being put down in the solid ledge, with considerable water to contend against. On an average not more than a foot a day is made. The ore in its general appearance resembles the Zeile rock. It is undoubtedly a continuation of the same ledge. It is of the greenstone formation, and carries a heavy percentage of live sulphurets. The shaft is now down between 50 and 60 feet, the ore body showing solid and compact throughout. How wide the ledge is, is not known, as it fills the entire shaft. It is thought to be between 20 and 30 feet wide. There are two ore piles on the dumps, one from the tunnel and early sinking, the other from the shaft since the whim hoist was put up. It is all milling rock, in fact everything coming out of the shaft is milling ore. The surface dump is estimated to yield from \$7 to \$10 per ton, as indicated by prospects in band mortar. Mr. Bright, the owner, intends to have a test crushing made of 300 or 400 tons as soon as possible. Mining experts who have seen the property are unanimous in the opinion that it promises to develop into a big mine. The claim embraces 2000 feet along the lode. Prospect shafts and tunnels have been made at different points along the lode, embracing nearly one-half the claim, and in every case a large ore-body has been encountered, which has yielded a paying prospect. The claim is not half a mile from the court house, and the opening up of a large mine at this point will give a genuine boom to Jackson.

BELMONT.—The superintendent reports the ten-stamp mill running full time, the surface tunnel having reached a point where the ore-body is 20 feet wide.

MISCELLANEOUS.—There is no change in the situation of the Amador gold mine. The sheriff is still in charge, with no immediate prospect of a settlement. The suit of Trotter and others against the English owners is set for trial in S. F. about the middle of next month. The ten-stamp mill of the McKenzie mine at Irishtown, which has been idle most of the winter, is to be started up shortly, on ore from the McKenzie claim.

WILDMAN.—Cor. Amador Ledger, March 28: Everything connected with the mining industry looks promising. At the Wildman, under the able management of the superintendent, John Tregloan, the many additions and improvements about the mine and mill have been made without the necessity of levying an assessment. The 30 stamps are kept going steadily and everything is in fine condition. The new pipe that has recently been laid to run the mill independent of hoisting works is a great advantage. S. Higgins is foreman underground, and from this time on they expect the mine to pay regular dividends.

NORTH STAR.—The stockholders in the North Star Co. are once more elated over a change for the better in the prospects of their property. The latter part of last week a small vein of ore was discovered, which carries free gold and prospects well. They had drifted alongside it for some distance, and in picking into the side wall of the drift they accidentally stumbled upon the pay streak. A blast has been put in 18 inches into the wall, revealing some fine-looking quartz. Beyond this nothing is known as to its dimensions. Not much stir is made about the discovery, as the hopes of the shareholders have been raised so often only to meet the bitterness of disappointment. In the present case, however, there is some going, which is regarded as an excellent sign of developing into a permanent ore body. Altogether, the outlook is considered more favorable than at any time since the development was started. The Lincoln mine is running along in the usual way. The making of the pipe for the Mahoney is almost finished, and it is being rapidly put in position. Inside of two weeks the connection will be made with the canal, and it is expected that the stamps will at once be started.

SOUTH SPRING HILL.—The South Spring Hill Co. are hauling rock from the Median mine to their mill for the purpose of crushing and testing the rock, and, if it pays, will develop that property, as they are now the owners of that mine. We understand there are about 500 tons on the dump.

Butte.

SENT FOR MORE HELP.—Nevada Transcript, March 28: Work seems to be going ahead at the Gold Bank mine, Forbestown. Quartz is being taken out at such a rate that the reduced force in the mill cannot handle it and Thomas Goynne of this city has been sent for to resume his position there.

Calaveras.

MINE SOLD.—Calaveras Chronicle, March 28: The Linderax location, situated near Sandy Bar, and owned by J. A. Lefoy, was sold last week to Messrs. Lee Vandel and T. J. Tynan. Developments on this lead show a well-defined six-foot ledge of free milling and sulphureted ore which will yield on an average of from \$15 to \$20 a ton. Although the mine has been but little developed, still the indications are said to be very favorable for a good mine.

SPECIMEN.—Mountain Echo, March 28: We were shown a piece of quartz the other day weighing perhaps three pounds that must have contained at least \$200. It was picked up somewhere in the vicinity of Six-Mile creek. The lucky finder refused to tell just where.

Napa.

ANOTHER FIND.—Napa Register, March 27: Mr. R. F. Grigsby, the owner of the Palisade mine in Kings Canyon, was in town yesterday. From him we learn that Dr. Smith, a man who has done a great deal of prospecting in and about Mt. St. Helena, the other day "struck it rich" just above the Palisade, uncovering a ledge of quartz six and a half feet wide and going down no one knows how far. Mr. Grigsby ran some of the ore through his furnace and got a yield of \$90 to the ton in silver. The deposit is the continuation of a ledge cut in the development of the Grigsby mine and is known to

bear gold as well as silver. "If in what are recognized as mining districts," said Mr. Grigsby, "prospectors had the success they have lately met with in old Mt. St. Helena, such districts would now be swarming with gold-hunters, but no excitement follows the finds in our own county, notwithstanding their richness and the possibility of their extent." And Mr. Grigsby knows a mine when he sees it, for a good share of his life has been spent in bringing the hidden treasures of New Mexico, Arizona and California to the surface.

Nevada.

STEEP HOLLOW GRAVEL CLAIM.—Transcript, March 28: Messrs. Beightol, Greeley, Mackin and Vance, who have for a year past been drifting for gravel at Steep Hollow, expect to soon begin to realize good returns from their labors. The tunnel is in 600 feet. When it was in 500 feet they made an upraise and found that they were under the channel near the rim.

STRIKE AT THE NEW EUREKA.—In the New Eureka mine at Grass Valley, owned by A. Walrath and others, a six-foot formation containing stringers showing free gold has been struck.

NEW EUREKA.—Grass Valley Union, March 28: The fissure in the New Eureka mine at the depth of 600 feet is showing large stringers that contain plenty of free gold, and the find is likely to prove important. The work of development on the mine has been going on for several years, and this is the most encouraging discovery yet found. The fissure is now fully six feet in width, and the indications are that the stringers will soon make into a strong vein.

WYOMING CON. MINE.—The Wyoming Con. M. Co. has recently added to the length of its location by purchasing 1500 feet of adjoining ground, which makes a total length of 2500 feet now owned by the company. The location now extends south to the boundary line of the Boston mine, and north to the Lawrey. The ledge through the ground thus acquired is the same as that running through the ground of the Wyoming Consolidated, and it is the intention to start up work soon on the property.

PEABODY MINE.—Grass Valley Union, March 27: The Peabody M. Co. is about to apply for a patent for its ground. There are several residence lots on the surface of the location, which are held by virtue of settlement and occupancy. As the Peabody Co. does not wish to disturb these settlers, seeking only to secure the quartz vein beneath the surface, it is likely that an amicable understanding will be arrived at by which no contest will be made against the company obtaining a patent to its location.

A MINING PURCHASE.—Cor. Nevada Transcript, March 26: Wednesday Mr. Alf Tregidgo, the popular mining superintendent, purchased the Denning ground, or what is known as the Parr ledge. The property is located between the Empire and W. Y. O. D. mines, in Grass Valley district. Mr. Tregidgo will leave for San Francisco when the company will be organized and will probably be known as the Parr M. Co. Work will be commenced on the mine in a few weeks.

Sierra.

STRUCK GRAVEL.—Mt. Messenger, March 28: The good news that gravel had been struck in the B. M. Extension new tunnel was telegraphed to the president of the company here last Monday evening, causing the stockholders, who mostly live in Downieville, to feel much encouraged after their long waiting. This company located its claims, northeast of Forest City, in 1874; commenced its old tunnel in fall of 1878, and in 1882 found its first pay gravel. It continued working with varying success, owing to the peculiar shape of the ground, until the fall of 1888, when the gravel channel was found to have been cut off by a cross channel, and all work of taking out pay gravel ceased. A year before this time a new tunnel had been started in a branch of Kanaka creek, and over 1000 feet completed. Upon the giving out of the old channel, work was pushed on the new tunnel, which, it was expected, would tap the old channel at a point on the ridge near where the old Dan Cole road intersects the Henness Pass road. The tunnel has been pushed from that time until now, when the company's perseverance has been rewarded by finding the long-looked-for channel. For some time past the tunnel has been in a yellowish slate formation, and last week it was decided to raise a shaft. At a height of 54 feet above the tunnel, rim gravel, which prospecting as such gravel usually prospects, was found. The shaft was raised four or five feet into the gravel which showed, beyond doubt, that it was on the edge of a channel. The tunnel had been run in the meantime until it is now about 60 feet ahead of the shaft in soft white slate bedrock. When the tunnel is 100 feet beyond the prospect shaft another upraise will be made. The main tunnel is a little more than a mile long. The people of Forest City are very much pleased at the prospect of again having the old Bald Mountain tunnel worked in their neighborhood, as it means an increased measure of prosperity to them.

WIDE AWAKE.—More fine-looking gravel has been found in the Wide Awake and the boys are more hopeful than ever that they have good diggings.

Siskiyou.

BLUE GRAVEL.—Yreka Journal, March 26: The blue gravel mine of Lee, Lash & Co. at Greenhorn still continues to pay at the rate of \$150 a day, with considerable of the cemented gravel laid one side along with the boulders for washing or crushing, on account of the former not dissolving in the water, and the latter containing gravel that will not wash off until slaked by exposure to the influence of the sun and weather. The gravel run through sluices also pays good wages for washing a second time, and when the claim is opened more extensively a still larger force can be employed with better profit. At present only four drifters can work at a time with four men on surface attending to steam engine, hoisting apparatus and sluices, but another drifter to each shift will be added this week, and more will be added as the drifts are enlarged to admit extra hands. During last week each shift of four drifters only filled from 6 to 8 buckets every day in consequence of the blue gravel being so hard to dig, hence there could not have been more than two-thirds of the above amount washed on account of cemented quantities laid aside. Yellow gravel has also been found lately in the drifts, which pays equally as well as the blue gravel, and gravel containing red cement is also found occasionally. We visited the claim some days ago and found Lash, Perlin and Kenyon, the three working owners, washing some gravel while the steam pump was idle

that had been run through the sluices before, which occupied about four hours time and paid over \$7 to each man. It is believed this blue gravel formation extends down toward and across Yreka creek, with probability of rich deposits beneath the race track grounds and all the surrounding country beyond in the neighborhood of the Kildore hills. If prospects now being made at different points near Yreka develop the same blue gravel at bedrock we may anticipate lively times in mining operations, to bring a return of the flush days of Yreka during the '50 period, when Yreka Flats, Hawkinsville, Greenhorn, Deadwood, Humburg and other sections paid exceedingly rich. Louis Guilbert and Uley Brown are now sinking their shaft again at the Kildore hills, about three miles south of Yreka, going down about five feet a day. Upon reaching 80 feet they intend using a whim to hoist by horse-power, and say the prospects look very favorable for striking blue gravel at 100 feet or less below the surface, some blue boulders having already been found. The hydraulic miners at Oro Fino and Quartz valley have not yet been able to start up, but they expect to get ditches filled very soon, now that the warm weather and spring rains begin to melt the snow on the Salmon range. Senator Campbell's men are opening a new claim this season near Mugginsville in Quartz valley, and the Eastlice Bros. and Wright & Co. are anxiously waiting for water to start their giants at Oro Fino.

HENLEY.—Cor. Siskiyou Telegram, March 28: Our miners and farmers are all feeling jolly over the rainy weather. The miners will have a fair supply of water this spring, and farmers will have plenty of water for irrigating purposes. The most of our people here are more or less interested in mines, particularly blue gravel. Everybody is looking to see this one of the liveliest mining camps in the State in the near future. Undoubtedly, we have a genuine blue gravel channel here—one that will pay and last for years to come, always yielding a good revenue to the owners. At present it is hard to tell how extensive this blue gravel is. It has been traced for several miles, and prospects got all along the west side on rimrock. The east side of channel has not been found yet, and no one can tell how far east from west side the gold extends. The course of this channel seems to be from northwest to southeast. The rimrock on the western side dips to the northeast at an angle of about 30 degrees. The blue gravel or cement is generally capped over with sandstone. The Klamath river cuts this old channel deeper than any other place in the county, and those people who have locations along the river can work their claims with less expense than other places back from the river. The channel is located for several miles on each side of Klamath river. Some of the companies have spent considerable money to develop their claims, and as far as the work has gone, it has been satisfactory to the owners. There is no doubt but what there will be considerable machinery erected the coming season on different mines. The cement or gravel in most places is very hard and will have to run through stamp-mills or some other process to pulverize it to get the gold out of it. Jilson & Co. have the only mine on the blue lead that can be worked with hydraulicking. They have about 350 feet pressure, which cuts the cement in very good shape. They use considerable powder to break up the large block of cement that comes down. Their bank at present is about 75 feet high. This company has spent about \$30,000 to open their mine. They dump their tailings in the Klamath river. They are driving a large tunnel now for drifting purposes, so that the mine can be drifted and piped at the same time, most of the pay being near the bedrock. The company will work day and night. They have a good mine, and believe in working it and getting out the filthy lucre. Capt. Wilhoun & Co. have a good mine on south side of Klamath river, which prospects well as far as developed. Several other locations on the same side of the river will be prospected this coming summer. Now we have the Hill mine on north side of river, east of Jilson's mine. This claim has got lower draining facilities than any other location in the district. The company has a tunnel in over 100 feet, with good indications of getting pay. The Black Jack Co. have spent about \$8000 in developing their location. They have had some of their cement gravel crushed with very satisfactory results. At the present time, their mine looks very encouraging. A. Harvey and others have located on the north of Black Jack mine. They have done some developing work. A Portland company is having a shaft sunk on their location, work being done by contract. The El Dorado Co. has had a hole drilled 160 feet to bedrock and got good prospects. There are several other companies that are developing their claims. Everything goes to show that this in the near future will be a lively mining camp. Jones & Hazlett have some very rich prospects out of their quartz ledge on Hungry creek, three-foot ledge, good prospects make one feel happy.

NEVADA

Washoe District.

YELLOW JACKET.—Virginia Enterprise, March 28: Are shipping to the Vivian mill 40 tons of \$18 ore as per battery assays per day.

BEST & BELCHER.—1000 level: Repaired and cleaned out 50 feet of north drift. 1100 level: West crosscut No. 1 has been advanced 10 feet through quartz, giving low assays; total, 194 feet. At a point in east crosscut No. 1, 32 feet from winze, started northeast and advanced same 16 feet. Face in hard porphyry and stringers of quartz.

CON. IMPERIAL.—We are still following up and taking out small streaks of ore from the upper levels, and overhauling the old stopes.

SEG. BELCHER.—On the 600 level the east crosscut from the south lateral drift is out a total distance of 193 feet, having been advanced 26 feet since last report. The face is in clay and porphyry.

CROWN POINT.—The south drift on the 300 level, is out a total distance of 50 feet, having been advanced 29 feet during the week. The face is in clay and quartz, with small bunches of ore. The 500 level west crosscut was advanced 18 feet since last report, making a total length of 182 feet. The face is in clay and quartz. Have done no work in the lateral drift from the east crosscut on the 1100 level during the week.

BELCHER.—The south drift from No. 2 east crosscut, 200 level, is out a total distance of 79 feet, having been advanced 36 feet during the week. The face is in clay and porphyry, with streaks of quartz

giving low assays. No. 3 west crosscut, 300 level, has been advanced 32 feet since last report, and is now out a total distance of 208 feet. The face is porphyry with streaks of quartz through it. Have started an east crosscut from the 1500 south drift, which is out 10 feet.

CHALLENGE CON.—The joint Confidence and Challenge west crosscut from the north drift on the 300 level is out 35 feet, having been advanced 10 feet during the week. The face shows quartz having no value. The joint Confidence and Challenge raise from the 750-foot level is up 207 feet, 17 feet having been made during the week. The face shows quartz having no value. The joint Confidence and Challenge west crosscut from the north drift on the 1100 level is out 264 feet, 14 feet having been made during the week. The face is in clay. Work on this crosscut has been suspended for the present. The joint Confidence and Challenge east crosscut from the north drift on the same level is out 5 feet, having been commenced during the week; the face shows quartz having no value. The joint Yellow Jacket, Confidence and Challenge north drift on the 100 level is in 590 feet. The face shows quartz having no value.

KENTUCK CONSOLIDATED.—In the east ledge, 20 feet above the 1000 level, have started a south lateral from the winze, which has been advanced 8 feet in low-grade quartz. Started a raise from the east crosscut from the north lateral drift which is up 5 feet. Was able to save a small amount of pay ore. Have advanced the north drift from the west raise 17 feet. The face is in quartz.

JUSTICE.—The north drift on the 822 level was advanced 25 feet during the week, making its total length 468 feet. The face is in a mixture of quartz and porphyry, with stringers of ore running through it.

SAVAGE.—We have hoisted 552 cars of ore from the 500, 750, 800 and 900 levels and from the intermediate level the 1300 level. Shipped to the Mexican mill 545½ tons and milled 540 tons; average battery \$17.10. We have bullion on hand and at the mill amounting to \$17,729.40. The north upraise, 300 level, is advanced 137 feet; the top is still in low-grade ore. On the 800 level the north drift was advanced 30 feet, making the total length 85 feet from our south boundary. From this drift and from the stopes on the 900 level, 80 feet north of the Hale & Norcross line, we are stopping good ore. On the 950 level the south drift from the station was advanced 25 feet; total length, 156 feet; face in porphyry. On the 1400 level we have completed the station at the bottom of the winze. During the coming week we will start a north prospecting drift on the 1100 level from the north line of the Hale & Norcross ground.

HALE AND NORCROSS.—On the 100 level of Norcross the north prospecting drift is advanced 25 feet, the face in low-grade ore. On the 1400 level No. 2 west crosscut from south drift was advanced 15 feet; total length, 120 feet. This crosscut has reached the footwall of the ledge. The face of No. 4 west crosscut is in low-grade quartz. West crosscut No. 5 on our south boundary, started jointly with the Chollar Company, shows 40 feet of quartz, giving some fair assays. A new west crosscut has been started north of south boundary line and advanced some 30 feet, the face in quartz and porphyry. The main south drift of this level having reached the south boundary, is being advanced into Chollar ground at the expense of the company.

OCCIDENTAL.—Extracting ore of fair quality from the stopes on the 400 level. The south drift from No. 3 upraise, 40 feet below the 450 level, is in 58 feet and is showing fair-grade ore. South drift from north line, 650 level, is in 137 feet; face in low-grade quartz. North drift from No. 2 winze, 660 level, is in 237 feet, face showing low-grade ore. Have started a south drift from No. 1 winze, on 600 level, which is in fair-grade ore.

CHOLLAR.—We are making repairs on the 100, 500 and 650 levels. The west crosscut on the north line, 1400 level, advanced five feet; total, 45 feet; formation, quartz and clay. The south drift, 1400 level, is in 10 feet south of north line. Sent to mill 535 tons of ore, which averaged \$18.70 a ton, as per battery samples.

POTOSI.—East crosscut 400 feet south of shaft, 930 level, is out 235 feet; face in porphyry. The winze is down 144 feet below the 1300 level; face in porphyry mixed with quartz. East crosscut from the winze, 1300 level, is out 152 feet; face in porphyry and streaks of quartz.

ALPHA.—The winze 80 feet north of shaft, 500 level, is down 61 feet; the bottom is in low-grade quartz. The north drift from the east crosscut, 180 feet east of shaft, 600 level, is out 68 feet; face in low-grade quartz.

ENCHEQUER.—East crosscut on the north line, 600 level, is out 147 feet; face in porphyry.

CON. NEW YORK.—The north drift, 1100 level, is out 338 feet; formation, quartz. The west crosscut, 310 feet north of shaft, 1100 level, is out 35 feet; formation, porphyry.

SILVER HILL.—Northwest drift, 50 level, is out 85 feet; face in hard porphyry. North crosscut, 640 feet from winze, 160 level, is out 25 feet; face in hard porphyry.

WARD COMBINATION.—East drift from 1800 station is out 905 feet; face in porphyry and clay.

ANDES.—The east drift from the main north drift on the 420 level, which connected with the winze from the 350 level, has been timbered up and the connection completed. We are now easing timbers in the main north drift. East crosscut from the south lateral drift on the 420 level has been advanced 18 feet; face in a formation of vein porphyry and clay.

UTAH.—725 level: In the main west drift, at a point 140 feet from the shaft, a south drift has been advanced 56 feet. This drift is running in a quartz streak averaging two feet in width, showing some value by assay.

Danville District.

SILVER.—Belmont Courier, March 28: O. S. Wailles of Fish Lake valley has resumed work on his mining claims at Danville district. He is extracting some rich silver ore. The prospects for Danville district are excellent.

Arabia District.

EXAMINING THE MINES.—Silver State, March 28: An Eastern mining expert passed west on Tuesday for the purpose of examining the Arabia mines, seven miles from Trinity mining district and about four miles from old Oreana. The Arabia mines

should pay handsomely by the cheap process now in use, as the ore is easily broken and there is abundance of it in this district. The Montezuma, Jersey, Dunderberg and Old Daisy, Series and other lodes have plenty of good ore in them and but little capital is required to make a big boom.

Morey District.

OUTLOOK.—Belmont *Courier*, March 28: The outlook for Morey is good. The mines are looking well and it is confidently expected that considerable work will be done on the mining properties in that district during this spring and summer.

Tuscarora District.

NAVAJO.—*Times-Review*, March 28: The 350 stopes are looking well and the grade of ore is getting higher.

NEVADA QUEEN.—North drift on 650-foot level has been extended 12 feet, and crosscut started east, which has been run 13 feet in hard porphyry.

NORTH BELLE ISLE.—North drift from Belle Isle 450-foot level extended 18 feet. The ore shows spots of ruby ore. Average assays of the ore \$102, and is improving. The 500 stopes yielded 16 cars of first-class and 119 cars of concentrating ore. North intermediate drift from No. 4 chute, 600-foot level, extended 18 feet. The face is all in vein with seams of ore coming in.

COMMONWEALTH.—Fourth level—West crosscut has been extended 27 feet; no material change. East crosscut extended 30 feet, cutting another flow of water and seams of clay. North drift in the vein extended 22 feet in low-grade ore. A drift south has been started in the vein, and in 11 feet. Putting in turntable and track has delayed the progress. Started work in both drifts last night and good headway will be made.

NORTH COMMONWEALTH.—First level—Has produced 20 carloads of first-class ore; average assay \$258 per ton, and 37 carloads second-class ore; average car sample, \$32 per ton. Second level—North drift from west crosscut advanced 27 feet, exposing 12 inches fair-grade ore, assaying from \$30 to \$277 per ton. Fourth level—East crosscut has been extended and timbered 33 feet, cutting clay seams; rock is the same as cut under the vein in east crosscut of Commonwealth.

Robinson District.

OPTION FOR A BOND.—White Pine *News*, March 28: Mr. J. A. Keating and Joseph Gans accompanied by R. H. Frank of Cherry Creek, spent five or six days here the latter part of last week and the first of this, examining the Joanna group of mines in Robinson District. The two first named gentlemen are experienced mining men of Montana, who can command any amount of capital if the venture warrants its expenditure. These gentlemen made a thorough examination of the Joanna and adjacent mines and expressed themselves as well satisfied with what they saw and the general formation of the mineral belt. They also went through the Chainman mine, which they had no hesitation in pronouncing a very valuable piece of mining property. They took their time, took no one's say so, but "panned out" for themselves, and the result has been satisfactory. We learn that Messrs. Keating and Gans got an option of 60 days for a bond on the Joanna, Joanna No. 2, Cloud and Great Western. The terms of the bond, which are perfectly understood between the parties, we are not at liberty to make public; but, we are informed, it is on such a scale that as soon as the bond is signed, the construction of a 20-stamp mill will be commenced at once and they expect to have it completed by the middle of July.

Columbus District.

A BRIGHT OUTLOOK.—Walker Lake *Bulletin*, March 28: Candelaria still continues to be a thrifty mining camp. The monthly pay roll amounts to \$50,000. There is sufficient ore in sight in the Mt. Diablo to supply the milling capacity for a long time. There is a large force of men constantly employed at the Holmes. A new pipe line will be laid, the present line being inadequate to supply the demand. The water is scarce a distance of 28 miles. Captain Channel, superintendent of the Princess, states that his company is prospecting and opening up new ground but not taking out any ore at present.

Oseola District.

HYDRAULIC MINING.—Cor. Nevada *Transcript*, March 22: As I look out I can see snow in every direction, although it is all gone around the mine. Up on the hills there is enough in sight to insure us a pretty good run of water for this season, as we have both ditches in order to catch the first water that comes in the spring. Unfortunately for us, last spring the new ditch and flumes were not completed until the best of the water supply was gone on that side of the mountain, and the ditch being new and cut through very loose ground in some places, causing it to leak more or less, gave us but little benefit; but now it is pretty well soaked up and I think capable of carrying its full capacity. We have flumes and pipe laid and monitors in position to work in good shape as soon as water comes. The weather has moderated considerably during the past week. The ice is melting fast, and there is quite a nice little stream of water in the old ditch which will melt the ice out pretty quick. There has been quite a stir here among prospectors this winter, mostly done through the dry wash process. Quite a number of locations have been made, and all the machines in the camp are being operated with very encouraging results. I have two locations myself, one of which is a bonanza as far as developed. I located it in January, but on account of storms, and cold windy weather could not do much toward opening it up. The formation is mostly lime and gravel all mixed up and very hard, resembling Portland cement, making it slow to work, as it has to be all broken up fine for the machines. The prospects range from \$4 to \$15 per hundred shovels. The regular way of working the machines is to count the number of shovels as you throw them into the machine, and clean up every one hundred shovels separately. There are several other locations adjoining mine that pay nearly as well. I think I happened to strike on the best part of my ground, as it is on a sort of a bar where the gravel is shallow.

Dun Glen District.

PROSPECTING.—Cor. Silver *State*, March 28: The mining industry, which, after all the bluster about water storage, still remains our only well-grounded hope for the return of anything like the good old times, seems almost paralyzed by a complication of adverse circumstances; yet a few hard-

palmed prospectors are still prospecting an intelligent and patient search for the hidden treasures of the mountains. Of our small population, nine men have worked steadily all winter developing claims and taking out ore for milling or shipment. Hendra Bros., owners of the Golden Chariot mine, have, during the winter, completed a tunnel started several years ago and tapped the ledge about 80 feet below the level of the workings. This will greatly facilitate the extraction of ore and enhance the value of the mine. The ledge is over four feet, and although not of high grade, is expected to pay well. They expect to start their mill in a week or two, and are hopeful of an all summer's run, as water will be abundant and the supply of ore is far in excess of the milling capacity. S. C. Thomas and his brother James have been busy all winter on his mine, taking out ore which fairly shines with yellow metal. It only takes a few tons of this ledge to yield a thousand dollars, it being small and of high grade. Nelson Bros. are hunting for a body of rich ore which they are hopeful of yet bringing to light. Armata & Miglu are shipping some fine ore taken out of the Monroe mines during the winter. Rich'd Eva has been prospecting for placers in Monroe canyon with success, though the work was prosecuted under great disadvantages.

Wild Rose District.

THE PARADISE PROPERTY SOLD.—Silver *State*, March 27: The final transfer of the Paradise Valley mining and mill property was effected yesterday at San Francisco and final papers executed. The property consists of the Paradise and Wild Goose mines and their several extensions and the mill property of the Paradise M. & M. Co. Said property was sold and deed made out to Doctor Hanson for a Boston syndicate, several members of which arrived in Nevada in company with Dr. Hanson about three weeks ago. They immediately visited and examined the mines and other property belonging to the company and were well satisfied. They then returned to Winnemucca and in company with Attorney MacMillan they examined the records. After being satisfied with the title, they repaired to San Francisco, and after a thorough examination of the company's books, the deal was closed yesterday. This company expects to expend about \$200,000 before receiving any returns. They will place an electric plant at the mouth of No. 6 tunnel, at the lower end of the canyon, and receive the power from Hardscrabble ranch on Martin creek, about four miles from the tunnel. The plant when finished will cost all of \$150,000. It is expected to have a capacity of 150 tons per day. As there are thousands of tons of ore in tunnels No. 4 and 6 that will go from \$14 to \$20, it will be a very easy matter to supply the plant with that amount of ore, as the ore will be dumped from tunnel No. 6 directly into the mill. We may expect in a very short time to hear of lively times in Paradise, and too much praise cannot be given Dr. Hanson for the successful manner in which he accomplished this transfer of the Paradise property. It will not only create a boom in Paradise, but it will have a tendency to bring other capitalists into this section of the country to look at other properties. The outlook is certainly much brighter for the future.

ARIZONA.

GLOBE.—Cor. Arizona *Enterprise*, March 26: The mining news is good, the prospecting of the Bisbee Co. we learn is satisfactory; the same indications of large bodies of rich copper ore is showing up on these claims as in the Old Dominion. There is no doubt but the claims are all that the company want. No one can tell what they will do, or when active operations will commence. All the chlorides are getting good silver ore; the Rescue is yielding large bodies of rich ore and no doubt will be a big mine. Good news comes from Pioneer; John Newman with his concentrator is doing a fine paying business with any quantity of ore for the purpose in sight.

CATOCIN.—Prescott *Courier*, March 31: Superintendent Johns says that the mine is looking well. He has two teams steadily engaged in hauling ore to the Prescott ore works.

SENATOR.—Supt. J. J. Williams has secured a large Pelton wheel and will run the Senator mill with it whenever there shall be sufficient water in Hassayampa creek. John S. Jones' plant, in Big Bug district, consists of a 5-stamp battery, slimer, concentrator and tables, which he will run by power of a 24-inch Pelton wheel. He has built a mile of fluming; will put in piping. He will have a fall of 180 feet. His intention is to have ore taken from his several ledges by contract.

NEW FIND.—Prescott *Courier*, March 29: Frank Kienle showed the reporter some handsome free gold quartz yesterday which assayed \$54 gold and \$3.20 silver from a new find—the Cumberland and extension—which he located two years ago. He has two feet of honeycomb rock in the ledge which assays \$300 gold. These properties are a quarter of a mile from the Railroad mine and two miles from the Blue Dick.

COLORADO.

FIVE THOUSAND DOLLARS PAID.—Aspen *Times*, March 28: The Argentum-Juniata Co. has paid in to the city Treasury the first installment of \$5000 for the privilege of mining under the streets and alleys of a portion of the east part of Aspen. The company was not obliged to pay it until the 30th of March. The next payment is to be made in 18 months.

THE BUSHWHACKER.—The Bushwhacker Co. continues development work without stopping to increase the output, which amounts to 10 or 15 tons of good ore per day. During the present month the work has been done principally in the fourth level north, which is also in good pay ore, and an upraise has been run from the fourth to the third level, with ore all the distance. Just how wide this ore chute is has not been determined. If it continues down to the Cowenhoven tunnel, a distance of about 1000 feet on the dip, the wealth of this body of ore alone will run up into the millions. The indebtedness will soon be liquidated and a receiver's receipt issued, when the stockholders may begin to expect some remuneration for their investments in the way of dividends.

THE LITTLE ANNIE.—Superintendent Atkinson yesterday telephoned the manager that he was in good ore in several places on the Annie. S. L. Hansbrough and Charlie Kutzleb came to the city

with some of the ore late in the evening that looks as if it would assay way up in the thousands.

THE WILMINGTON.—J. W. Nugent, who, with the Continental Divide Mining Investment Co., is working the Wilmington of the Climax group, was in the city yesterday feeling jubilant over some fine-looking ore he had struck in the north drift. He thinks that a big ore body is being tapped and says he will quit the country if he does not have pay ore in 30 feet.

THE PARK-REGENT.—Manager Wright is expected home to-day from New York, where he sold enough Bushwhacker stock to finish paying for the Park-Regent and Tiger. His property is looking well. Development work in the north end of the Park has been commenced through the Iowa shaft. Mr. Wright thinks he has the down-hill pull on a large portion of the world in that part of his ground.

DAKOTA.

BLANQUILLA.—Deadwood *Pioneer*, March 27: Development work on the Blanquilla group of mines continues steadily. There is now five feet of ore in sight, overlaid by a three-foot vein of manganese ore, that carries a little gold and silver. An assay of five samples from the ore body gives an average value to the ore of \$38.29. This property is located on Squaw creek, and is one of the most promising properties in the Hills.

KEYSTONE CHLORINATION WORKS.—Messrs. Keith and Cameron returned yesterday from Chicago, where they had been purchasing the new machinery for the Keystone Chlorination works. The first carload of material will leave Chicago about April 10th, and the remainder will be shipped on the 23rd. The rock-breaker and pulverizer is a new improvement of the Gates style, combining a crusher and pulverizer that grind up the ore to allow it to pass through a 10-mesh screen. This is the first crusher of the kind sent out of the Chicago works, and Mr. Gates will be present himself to witness its workings. All the ore that is too coarse to pass through the screen is hoisted up by an elevator and sent through the crusher again. The roaster weighs 42,000 pounds, and will be capable of treating 50 tons of ore per day that does not carry over 10 per cent sulphur. There will be three pumps, one for water, one for acid and the third for chlorine solution. A compressor is ordered, for compressing the cakes of sulphides. The barrels have been ordered from Fremont, Neb., as the house there underbid the Chicago concerns. One barrel, capable of treating 24 tons of ore daily, was to be completed in ten days, and the other about May 1st. The engines and other machinery were ordered at Chicago.

IDAHO.

DELAMAR.—Cor. Idaho *Statesman*, March 28: Since my last the blower at the mine has been put in place and the large pipe made by Theo. Phillips of Silver City has been placed in the tunnel and connections made with pipes leading to all the different sections of the mine where needed. The blower was started up on the 12th, everything worked to a charm and the boys are now fully supplied with plenty of good air throughout the different workings. In many places it was badly needed as the air was exceedingly close, the chambers warm and the powder, smoke and gas would never entirely disappear. It has been found that the wires conveying the power from the dynamo to the electric hoist at the winze are not large enough to run the hoist and new and larger wires were accordingly sent for and are on the way.

THE NAY AUG SHUT DOWN.—Wood River *Times*, March 28: The Nay Aug mine was shut down temporarily yesterday, it being impossible to work to advantage with the present machinery. It will probably remain closed for a month or six weeks, or until the roads become passable, when operations may be resumed. One of the first moves in that direction will probably be the erection of a concentrating mill; as there are between 800 and 1200 tons of second class ore on the dump, besides large quantities in place in the mine.

FROM CLAYTON.—The Custer mill, which has been shut down for over a year, will resume operations about the 1st of May.

LOWER CALIFORNIA.

ALAMO.—Lower Californian, March 26: The E. Paso mill is running on rich ore from El Paso mine G. F. Dow and partner are at Tableta. The saw mill will start up at once. The Frenchmen's mine over Tomasa's eyebrow pays \$100 a ton in red gold if it pays a cent. The Manzanita mill is running and Col. Lane's mill is crowding ahead. All the other mills, also, are in full blast. Parties from the Cucapa placers arrived at the saw mill last week and reported rich ground. They returned at once after getting supplies. It is reported that silver has been found in Valle Trinidad. The floaters and kickers are waiting for the boom in San Quintin to drift down that way. Speaking of San Quintin, a mining man here says that it is bound to be the center of mining activity soon. Valladares, Santo Domingo, Agua Dulce, Socorro, San Fernando, Calamajue, Calmali and other camps will be tributary to San Quintin. Nothing new has developed in the vicinity of Alamo or in the mines during the past week. The Aurora has started on its upper ledge, the Boracha, where promising ore is in sight. The ore in the regular ledge is all stopped out. The Indio is sinking under the steam drill, and drifting is continued on the Ulises. The lessees of the Montezuma are doing a little development work. The El Paso is drifting.

MONTANA.

BIMETALLIC.—Phillipsburg *Mail*, March 26: The bimetallic company are now going ahead with the work of excavating for the new 50-stamp addition to their mill at Clark with all possible speed. All the men and teams that can be worked to advantage are busy on the ground, and material is constantly arriving for the new structure, which it is thought will be completed and ready for use not later than July 1st. When this addition is finished the bimetallic company will have 100 stamps dropping under a single roof, which will be the largest dry-crushing mill in the world.

There can be but little doubt that when this new addition is completed it will not be long until the bimetallic will take first place among the silver pro-

ducing mines in the world. The work of building the new addition has already shown its effect in the camp, and increased activity in all branches of business is noticeable.

NEW MEXICO.

GOLD.—Southwest *Sentinel*, March 26: N. Bell brought down last week gold to the amount of 65 pounds, valued at \$124,80, and his concentrates, which will net as much more, all from about 400 tons of ore taken from his mine. Mr. Bell says all he wants is a few weeks' notice when the two-pound gold brick is wanted for the world's fair, and he will get it ready. He will take it out of the ore in his mine very quickly. Frank C. Bell has uncovered a body of ore in one of his claims at Pinos Altos that runs 53 per cent lead, 18 ounces silver and \$3 in gold. It is rumored that something will soon be done at Paschal and Santa Rita in the copper line. C. E. Miller has a fine showing in the Langston mine at Pinos Altos. He was down to Silver City last week endeavoring to secure facilities to have his ore treated. We notice the iron ore shipments are increasing from Silver City; 15 carloads during the week went out over the A., T. & S. F. R. R. H. H. Betts made a shipment of high-grade silver ore to the Rio Grande Smelting Co. last week.

CARLISLE.—James Tong, of the Carlisle Co. reports the new camp about two and one-half miles west of Carlisle in a flourishing condition. From the Alabama Mr. Tong has shipped three cars of ore, the first averaging \$76 per ton, the second car \$220 per ton and the last car \$750 per ton. The ore taken out while sinking the shaft paid \$125 per foot. Belton and Reardon, the owners of the Julia, have been working steadily and shipping \$75 ore. R. M. Rucker has a 12 foot lead which averages over \$30 per ton. Work is progressing on the Gold King, owned by Epley, Bailey and Tong. Twenty-three tons of ore worked in the Carlisle mill averaged on the plates \$16 per ton. Ore is still being shipped from the Jim Crow, the first class averaging from \$200 to \$250 and the second-class about \$60. This new camp has but recently come to the front as a producer, and with the exception of two or three of the claims all of the rest have been located within the past six months. The veins are all true fissures of a good average width and a grade that will pay to ship. The bodies of ore are simply wonderful, and in a short time the camp will be the most prosperous in the country.

OREGON.

THE EASTERN OREGON PLACERS.—Bedrock *Democrat*, March 26: Owing to the unusually heavy fall of snow in the mountains in Eastern Oregon, this season will be a splendid one for placer mining. There will be water in the canyons and gulches until late in the season. This will greatly facilitate the operations of the miners. Where canyons or ravines have crossed mineral veins containing gold, in their course down mountain sides, more or less of the shining metal will be found in the gravel. As there will this season be water with which to prospect in many places where in ordinary seasons no water is found within miles, it is likely that rich placer ground will be struck on not a few benches and flats, where heretofore the advent of the pick and shovel were unknown. From Luther D. French, who was in this city yesterday, the *Democrat* learns that the snow is still about 14 inches deep in Sumpter valley and in the mountains it is much deeper than it was last season. The gentleman states that it is packed solid and will disappear very slowly. It is probable that quite a number of placers in the Auburn district which have remained idle for several seasons past, will be worked this. The outlook for the placer miner this season is undoubtedly most flattering.

UTAH.

ORE ON THE MARKET.—Salt Lake *Tribune*, March 25: To-day there will be 700 tons of Horn Silver ore on the market, and ore-buyers will have a lively time bidding for it. Shipments from this mine have become quite regular and also quite large.

MOVEMENT OF ORES.—The movement of ore in the camps near this city has almost stopped. At Bingham the roads are in a wretched condition, and this has stopped most of the ore hauling. At Park City there is snow, slush and mud, and it was snowing more the past two days. The roads to the mines are too bad to get ore down. It is probable the Crescent will not be able to send any more ore down until the snow is far enough gone to permit operating their tramway. Their new larger locomotive should be received by that time and enable more rapid ore transportation to the concentrator. At Tintic there is but little snow in the towns of Eureka and Silver City, but lots of it on the hills, while between the mud and snow, ore-hauling is about at a standstill.

THE BUCKHORN.—The Buckhorn, at Ophir, under the new management has a force of 25 men working on the lower levels, and is opening up large bodies of ore. Since snow is two to three feet deep up about the mine, no ore is being shipped at present, but it will move fast in the spring.

SMELTER.—Salt Lake *Tribune*, March 26: P. A. H. Franklin returned yesterday from his visit of five weeks to New York, Boston, Philadelphia, etc., whither he went in the interest of his mining operations. One object was that of arranging for a big smelting and refining plant near this city, and in this mission he has fair promise of success. This matter, however, is not in condition to make fully known to the public what has been or what is likely to be done in the near future. In the meantime the operations of his big group at Bingham, the Niagara will go ahead and his plans of making that a great property will be carried forward as fast as possible. Mr. Franklin found much interest in mining among the capitalists with whom he came in contact.

ORE AND BULLION SHIPMENTS.—Park *Record*, March 28: The Ontario mill shipped 24 bars of bullion this week, amounting to 16,386.15 fine ounces silver. Jerry M. Richardson shipped to-day 128,000 pounds of first class ore. He has a large tonnage on the bill that he cannot get down just now owing to the bad condition of the roads. During the week there was received at and forwarded from the Mackintosh sampler the following lots of ore: Ontario, 256,970 lbs.; Crescent, 283,400; Anchor concentrates, 205,480; Cumberland (first shipment), 1750 pounds; total, 787,600 pounds.

MECHANICAL PROGRESS

Mechanical Progress in China.

The Chinese, in many respects are a rational and practical people. There are many among their learned and influential men, who have become quite thoroughly imbued with the value of the progressive ideas which have interested "the outside barbarians" during the last century. But unfortunately the stationary and superstitious notions which have been inbred into the common people during the thousands of years of their isolation as a nation, are very difficult of any sudden eradication. Such would have been the case with the masses of any people, who have so long been accustomed to thoughts and ways handed down from so many generations under a continuous and uniform mode of government and education.

But if their present intercourse with foreign nations is kept up for a series of years, their antiquated notions will soon give way and China will step out of her Rlip van Winkle sleep and come to the front with a power and influence that will astonish the world.

That the Chinese are really a practical people, and that the work of revolution has already commenced may be inferred from what follows:

During a recent anti-foreign-devil riot at some place between Tongfu and Kaiping the mob, by way of emphasizing its patriotic sentiments, destroyed a good length of railway that has recently been carried through the district. The local mandarin—a Chinese Raskinle apparently—instead of using the forces under him to quell the riot sent his soldiers to assist in the pious work. The embankments were leveled for some distance, and the rails thrown into the river, and an attempt was made to destroy the bridges. Mr. Kinder, the engineer of the line, laid the state of the case before the Taotai of Tientsin, who is the head director of the undertaking. The Taotai sent for the mandarin, and addressed him thus: "To please yourself and your friends you have destroyed the railway track. To please me you will put it back just as it was before. If, one month from to-day the trains are not running the same as before, you lose your head and your family and ancestors are disgraced."

"Mr. Kinder estimates the damage and loss by non-running of trains at 50,000 taels (about \$12,500) which sum you will have to pay out of your own funds to the company. For labor, all your officials, soldiers and the townsfolk will work as you direct, receiving no money for their labor, and all salaries are stopped until the repairs are complete. I shall appoint a board of punishment to return with you, with power to torture and imprison anyone who makes the least disturbance or trouble." The mandarin begged for mercy on the plea that, as the country was all under water he could not possibly get mud and stones wherewith to build the embankments. The Taotai saw the force of this plea, and said he would give him a chance. He could pull down any of his forts he liked in order to provide material for the repair of the railway, and he would give him three months after the railway was completed to rebuild his forts at his (the mandarin's) own expense. In rather under three weeks the trains were running again, and they are now rebuilding the forts. How long would it have taken to bring about the same results in England?—*London Truth*.

Much trouble in the way of railroad building has been encountered in China on account of the multiplicity of graveyards and the prejudice which exists against disturbing places of sepulture. A road lately surveyed between Kowloon and Canton has been for some time held in abeyance on this account; but even that prejudice has now been overcome and the modern symbol of progress, the locomotive, will soon be seen in the great city of Canton. This same prejudice stopped progress on the Boston and Providence road in 1835—one of the very early roads in this country. People turned out with arms to drive away the railroad workmen; but better counsils soon prevailed, and work went on.

It is not at all likely that there will be any more railway demolition in that province. Another evidence of the really progressive steps which China is now making is found in the efforts now being made by the Government of that country toward the establishment of extensive and complete iron and steel works. About a year ago two English engineers went to China to take charge of the work for the government, and the preliminary arrangements have been made. The site chosen for the works is near the junction of the Han and Yangtze rivers, opposite the city of Hankow, in the province of Hoo Pe. The plant will include two large blast furnaces, capable of producing about 100 tons of pig iron daily. There will also be a complete Bessemer steel plant, with two five-ton converters and all the necessary outbuildings, casting cranes, blowing engines, etc. The product of this plant will be made chiefly into rails and there will be a large rail mill with all its appliances for this purpose.

It is officially stated that the manufacture of rails for future railroads is one of the chief objects of the Chinese government in building these works. There will also be a small Siemens-Martin open-hearth steel plant for the manufacture of ship-plates and mild steel for small fire-arms. There will be a very complete iron mill, including 20 puddling furnaces and a plate and bar mill. The works will cover about 40

acres, and will be traversed by numerous small railway tracks for the handling of materials and products within the works. The contract for the machinery for the entire plant was placed with an English house, and the specifications call for the delivery of all the material early in 1892. A large quantity of the machinery has already been shipped, and all of the blast furnace material is now on the site of the works.

There is good reason for believing that at no distant day China will take a stand high among the nations of the earth, as a progressive and powerful people. When she does so, San Francisco will occupy a position of the highest commercial importance in relation to the trade not only of China, but of all the Orient as well. The four great commercial cities which will then sell the markets of the world will be London, New York, San Francisco and Shanghai or some other favorable city location which may grow up on the coast of Eastern China, not now known to the world.

COMMON SENSE IN MECHANICS.—No amount of education and practical training will make a thoroughly good and competent workman of a man who has no inclination or natural ability for a certain line of business, and especially is this true of the mechanic. The construction of machinery at the present time is an art that calls for a man with natural ability and adaptation. It is not merely a following out of theoretical plans and calculations. Neither is it a work in which handicraft alone can succeed. It may be true that a large proportion of workmen are what might be termed skilled artisans, who are capable of doing the part assigned them in a creditable manner, and sufficiently well to make the completed mechanism a perfect-working and well-proportioned production. But there is something more than this in the trade. These are not the men who work out or suggest improvements, who can be trusted with the more important work of designing and constructing. There is no trade in which there is a larger field for the display of common sense than in the machinist's trade. It is the exercise of this very important element of a man's make-up that earns for him a reputation and a standing that no amount of theorizing will bring. There are so many different ways of accomplishing the same result that it requires a man of good judgment and a quick perception to see which way is best in a particular case, and very often calls for the exercise of good common sense.—*Ex.*

A FIVE-MILLION DOLLAR BATTLE SHIP has just been launched at Portsmouth, England. She is called the Royal Sovereign and is the largest war vessel ever constructed in England. She has a displacement of 14,150 tons, and an indicated horse-power of 9000 natural draught, and 13,000 forced draught. Her forced speed is to be 17½ knots. She is protected by a steel belt 280 feet in length, 8½ feet in height and 18 inches thick. Above that is a three-inch steel deck, and it is terminated by transverse armored bulkheads, the lower edges of which rest on steel decks extending down in curves to stem and stern. Above the belt the broadside is protected to a height of 9½ feet above water by five-inch steel armor, the battery being shut in fore and aft by steel bulkheads. On the barbette towers the armor is 17 inches thick, the protection being carried down to the belt. The principal armament consists of four 13½-inch 67-ton breech-loaders, disposed in two towers, all four guns being available on either broadside. The secondary armament consists of ten 100-pounder, 16 six-pounder and eight three-pounder quick-firers. The Royal Sovereign is one of a group of eight first-class armored battle-ships embodying the views of a majority of the most experienced naval architects regarding speed, coal-endurance, freeboard, armament, and armor protection. The design of the battle-ship is more like that of the Boston than any other warship in our navy. The estimated cost of the vessel is \$5,000,000.

IMPROVEMENTS IN PULLEYS.—An important improvement has been made in the covering of pulleys, by which it is claimed fifty per cent more power can be transmitted, and all slipping is reduced to an imperceptible factor. This system comprises the following points: It consists in the employment of a specially prepared leather covering for the pulley, which is extremely soft and elastic, and never glazes by the rubbing action of the belt, as is the case when ordinary leather is employed for this purpose. It is applied to the pulley, and held firmly to it, for all time, by means of a special cement, which is soft and never hardens like ordinary cement or glue. No rivets of any kind are employed, but the leather covering is firmly attached to the iron of the pulley by the cement alone. Covering iron pulleys with paper is sometimes practiced, the covering being done as follows: First cleanse the pulley from grease with sal soda (washing soda). Then scotch the whole surface with a file. Wet with dilute nitric acid for a few minutes to deaden the scratches, clean with water, and dry. Apply the paper by winding, using the strongest glue, or the paper may be wetted with tannic acid and then applied as above. Some prefer to add a tablespoonful of glycerine to a quart of glue and then apply hot. Turn off the edges and apply a coating of common shellac.

EDISON'S PROFITS from his electrical inventions are estimated at not less than \$12,000,000.

SCIENTIFIC PROGRESS.

Grass and Its Mission.

Next in importance to the divine profusion of water, light and air, those three physical facts which render existence possible, may be reckoned the universal beneficence of grass. Lying in the sunshine, among hut-troops and dandelions of May, scarcely higher in intelligence than minute tenants of that mimic wilderness, our earliest recollections are of grass; and when the fitful fever is ended and foolish wrangle of the market and the farm is closed, grass heals over the scar which our descent into the bosom of the earth made, and the carpet of the infant becomes the blanket of the dead.

Grass is the forgiveness of Nature—her constant benediction. Fields trampled with hattle, saturated with blood, torn with the ruts of cannon, grow green again with grass and carnage is forgotten. Streets abandoned by traffic become grass-grown, like rural lanes, and are obliterated. Forests decay, harvests perish, flowers vanish, but grass is immortal. Belegged by the sullen hosts of winter, it withdraws into the impregnable fortress of its subterranean vitality, and emerges upon the solicitation of spring. Sown by the winds, by wandering birds, propagated by the subtle horticulture of the elements which are its ministers and servants, it softens the rude outlines of the world. It evades the solitudes of deserts, climbs the inaccessible slopes and pinnacles of mountains, modifies the history, character and destiny of nations. Unobtrusive and patient, it has immortal vigor and aggression. Banished from the thoroughfare and field, it hides its time to return, and when vigilance is relaxed, or the dynasty has perished, it silently resumes the throne from which it has been expelled, but which it never abdicates. It hears no blazonry of bloom to charm the senses with fragrance or splendor, but its homely hue is more enchanting than the lily or the rose. It yields no fruit in earth or air, yet should its harvest fail for a single year, famine would depopulate the world.

THE RELATIONS OF MEN OF SCIENCE TO THE GENERAL PUBLIC was the title of the address of T. C. Mendenhall, as retiring president of the American Association for the Advancement of Science, at its annual meeting in Indianapolis for the year 1890. The main points of his theme were:

1. The particulars in which scientific men fail as exponents of science among their fellows. Under this head is named, with proper qualification, the fact that such men are sometimes unable, or unwilling, to present the results of their labors in form intelligible to intelligent people.

2. Men of science are liable to fall into the error of assuming superior wisdom as regards subjects outside the lines of their specialties.

3. Men of science are not always reasonably free from egotism in matters relating to their specialties, particularly in reference to authority and attainments in the same.

4. Another element of weakness in scientific men is that they are often less "practical" in their work than they should be. Sometimes they even despise the useful and practical in science, and their dignity is disturbed when an honest and innocent layman asks what the use of this or that discovery is. This we deem one of the most important points of the address, because the fault is so commonly noticed and spoken of by intelligent laymen. We have ourselves been recently ashamed of some of our prominent scientific men for grievous errors in this way.

5. The last point of the paper is the demand which the public may justly make upon the man of science, that his interest shall not be less in public affairs than that of other men. The paper, as a whole, is well calculated to call the attention of scientific men generally to a line of usefulness and an opportunity for good not fully appreciated heretofore.—*Sidereal Messenger*.

THE SCHISOPHONE.—This recently invented instrument for detecting flaws in iron, from which so much was expected, seems to have greatly disappointed those for whose benefit it was designed. In common with many of our contemporaries, we have made several favorable allusions to it; but the *Scientific American* now gives the following discouraging paragraph: Railroad men, especially, will regret that the schisophone, an electrical instrument invented by a Frenchman for detecting flaws in metal castings and forgings, is not realizing the promises made for it, for in the newer railroad science, though sturdy and ingenuity have found means of greatly lessening danger through broken axles and wheels, through collision and the like, no amount of inspection has sufficed to detect flaws in rails and to prevent rail-splitting. Hammering was the only known test, a fairly accurate one, it would seem, when the defect was of an exaggerated description, the human ear being sensitive enough to note a certain dullness in the sound which the hammer gave, but it long since became evident that flaws could exist and the blow of the hammer give no recognizable signal. The schisophone could unerringly do this, had, indeed, accomplished it repeatedly. That is what the first reports of the instrument declared, indicating the defective point, and he-

ing corroborated when the rail was broken and examined. This seems now to have been an exaggeration.

RAIN RECORDS in various parts of the State show not only great variations in different and distant localities, but also important variations in quite near localities and under the same topographical conditions. Even different portions of a large field, without any marked differences of elevation show quite a difference in rainfall. This is accounted for from the fact that the rain does not fall equally from all parts of a cloud. The condensation proceeds diversely in different parts. Rain gauges under different portions of the same cloud would record variously. The edge of the cloud might pass over one instrument, while the center would pass over another. Then again, rain falls from different heights, under which conditions there would naturally be varied amounts of condensation.

A FINE POINT.—Experiments made by Pratt & Whitney, of Hartford, Conn., have shown that light can be seen through a clean out opening of not more than one forty-thousandth of an inch. This fact was determined by taking two thoroughly clean straight edges, placing a piece of paper between the surfaces at one end, the opposite end being allowed to come together. The straight edges being placed between the eye and a strong light in a dark room, a wedge of light was perceived from the ends between which the paper was placed and the opposite which were brought together. The thickness of the paper being known the distance apart at the two edges of the small end of the wedge of light was easily calculated, and the result was shown as above.

CARBONIC ACID IN FOGS.—Experiments made by a professor of University College, Dundee, has shown the high percentage of carbonic acid in the atmosphere during fogs. At a time when the fog was densest, eight volumes in 10,000, or more than double the normal amount for the particular locality, was found. In London and Manchester the percentage is much higher. The circumstance thus noted is readily accounted for by the fact that the dispersion of the products of combustion and animal respiration is hindered by the stagnation of the air during the continuance of a fog.

THE MYSTERIES OF NATURE.—The telescope enables us to gaze through the boundaries of the stellar universe; the microscope enables us to look through the stratum of living forms and see the expanse of unappropriated mineral elements. Life even in its minutest forms is superimposed on matter. Strange life! The animalcules a million times smaller than the finest point that can be broken from a cambric needle manifests instincts as remarkable as are observed in higher animals. * * No words can describe, no pencil paint the wonders revealed in a single drop of stagnant water.

BAROMETRIC PLANTS.—A recent little work on barometric plants published in France, gives, among other interesting facts, the following: If the stalks of clover and leguminous plants stand upright, there will be rain; if the leaf of the wood sorrel turns up, it is a sign of a storm, as is also the closing of the convolvulus flower, the expanding of the lettuce flower, and the turning upside down of the flower of the pitcher plant; but if the last named stands erect it will be fine, as it will be if the flower or the sorrel opens.

THE POWER OF LIGHTNING.—It has been calculated that the electro motive force of a bolt of lightning is about 3,500,000 volts, the current about 14,000,000 amperes, and the time to be 1-20,000th part of a second. In such a bolt there is an energy of 2,450,000,000 watts, or 3,284,182 horse-power.

THERE is now being finished at Greenville, Pa., a disc of glass for a refracting telescope lens, which is claimed as the largest that has ever been made in the United States. The disc is 30½ inches in diameter by 5½ inches in thickness, and weighs over 300 pounds.

TO PREVENT the snapping and cracking of radiators when the steam is turned on, the valves being open, it is only necessary to cause the steam to enter slowly, giving the water a chance to escape and the radiator time to warm up.

PHILOSOPHY OF THE ARC LIGHT.—Scientists tell us that the light from the electric arc results from the vaporization of carbon. It is estimated from theoretical grounds that to produce this over 10,000° Fahrenheit is required.

IT has been found, says the *Evening Post*, by careful experiments on plants grown in a confined atmosphere that they abstracted nitrogen from the air around them to the extent of 30 cubic centimeters.

THERE is very little ebb or flow of the tide in the Arctic, but occasionally there are very strong currents. All winter there is a general flow of tide and ice toward the south, while in summer this flow is northward.

OVERHEAD ELECTRICAL TRACTION is meeting with much trouble amid the snow and sleet storms of the East; but such disadvantages are not met with in California outside your highest mountain region.

GOOD HEALTH.

Concerning Cancer.

EDITORS PRESS:—I have read with great interest for several years the cancer discussion, and purported ones of Dr. Cook, which have frequently appeared in the Health Column of your highly appreciated paper, and the fact alone that Dr. Cook is supported by so good and discreet a journal as we all know the PRESS to be is evidence of integrity, good-will to man and that you have no other purpose in view than to put before the world a safe, humane and certain cure for that dreadful malady.

But it looks strange indeed that you should have, as you say you have, within the limits of your wealthy and progressive city of San Francisco 600 miserably afflicted human beings constantly suffering with this dreadful disease; that such an amount of suffering should exist among philanthropists such as the world has never before seen and among that type of men whose very nature has been formed from their peculiar surroundings, and whose first impulse is and always has been to divide the last dollar with a needy fellow-being when such a remedy for so much suffering exists at your very door. Why do those same men stand by and see 20 of this unfortunate 600 die every month when through your reliable and broadly circulated journal you have made it plain to the people of the Pacific Coast that you have a sure and certain remedy for this malady?

It seems to me it would be a far better way to spend some of your surplus money in spreading the news of such a discovery and furnishing the means for its application to the many suffering cancer patients in your city than to expend it on a great institution of learning and science. Why these 600 people suffering with cancer in San Francisco can sit down, or be allowed to sit down, when you claim a positive cure, is more than I can understand.

Take to these sufferers your printed testimonials, giving sex, age, place of birth, present place of residence, when afflicted with cancer, and if same has ever been removed by a surgical operation, and by what physician the diagnosis was made, and prove to those afflicted ones that proper diagnosis was made on those cured by Mrs. Cook, and give names of said physicians and such other information as your own good judgment might see fit; then you will be placing yourself upon a firm foundation, and if Dr. Cook's remedies have merits you will be doing a good work. Great merit in anything or on any proposition should not go begging, and real merit of itself will over-ride anything in the shape of mere prejudice. You have the location and advantage in every way; you have the afflicted ones on whom to bestow your benevolence and wonderful treatment. Cure these 600 cancer-suffering people, or 75 per cent of them, and you need ask for no investigation; the investigation will come. It will come through pure merit and it will be general, and if it comes, my deepest and heartfelt hope is that it will be successful. A constant reader, yours truly, J. C. WOODWARD.

Silver City, March 8, '91.

The writer of the above is one of the firm of Woodward Brothers, founders and machine workers of Silver City, New Mexico. Letters of similar import are constantly being received in this city from various parts of the Pacific Coast and from the East, wherever the MINING AND SCIENTIFIC PRESS is circulated. The same question is also constantly being asked by thousands of people in this city, and much astonishment and no little indignation is being expressed in all quarters at the manner in which the medical faculty of this city, as a body, is steadily ignoring facts which are daily being brought to their notice, and discouraging patients from placing themselves under Dr. Cook's treatment.

We are pleased, however, to state that just at this time there is good reason to believe that proper attention will soon be given to the matter. A petition was sent in to the City Board of Supervisors last week, asking them in view of the large interest which is being felt in this matter by our citizens at large, to make a request of the City Board of Health to appoint a suitable medical commission to make a thorough investigation of this alleged cure, and report upon the same. The Board acted upon the matter promptly, and authorized the Hospital Committee to make the request, and we are assured that that Committee will attend to the duty at once, and we further presume that the Board of Health will lose no time in taking the necessary steps to secure the desired investigation. W. B. E.

Cure for Catarrh.

EDITORS PRESS:—Thinking the enclosed recipe, which proved so valuable to a friend of mine, may be of use to some of your readers, I have copied it as she gave it to me:

"Take one part pulverized saltpetre and two parts pulverized angar. Dissolve one-third teaspoonful in one-third small cup of water and

syringe the nose three to five times a day, according to the severity of the case. Continue for weeks or months if necessary."

Said a lady to me: "I had catarrh in the head so I could scarcely breathe through my nose, and I tried this treatment for several months and it effected a complete cure." It is beneficial sometimes in cases of la grippe.

National City.

ROCK MAPLE

ELECTRICITY.

A DARING PROJECT.—One of the features of the coming electrical exhibition at Frankfort-on-the-Main will be the transmission of power on a scale hitherto never attempted. When it was announced some months ago that it was proposed to transmit 100 h. p. from Lanfen-on-the-Neckar to Frankfort, a distance of more than 100 miles, the statement was received with smiles of incredulity, but now it seems quite probable that not only will the experiment be tried, but that it will succeed in spite of the engineering difficulties that have to be surmounted. The Government has been asked to supply line for the purpose, and on the system used the expense will not necessarily be at all severe, for the use of very high potential alternating currents is the feature of the scheme as at present planned. The alternating generator will supply a step-up transformer that in turn will transmit its secondary current at an enormously high potential along the line, to be re-transformed by a step-down transformer at Frankfort to a potential practicable for an alternating motor. A series of experiments carried out recently at Oerlikon involve the use of pressures as high as 33,000 volts on the line. At such a potential the current transmitted becomes so small that the line is a relatively small factor in the losses incurred, even though it be of the extreme length proposed. Nothing can better illustrate the characteristic advantages of the alternating system than this beautiful process of generating and utilizing currents at a moderate potential, and transmitting them from station to station at a pressure so enormous that the losses in transit become insignificant.—*Electrical World*.

THE FIRST ELECTRIC RAILWAY.—Mr. L. F. Andrews communicates the following to the *Electrical World*: "In your issue of January 31st I find the report of a paper read before the Electric Club of New York by Franklin L. Pope, in which he refers to the probable first electrical motor as being the invention of Thomas Davenport, at Brandon, Vt., in 1835-8. He says that with the aid of another mechanic he made a motor. I desire to confirm Mr. Pope's statement. The 'other mechanic' was Collins Andrews, my father. I well remember the long and vexatious series of experiments made by these two men. The greatest obstacle they had to contend with was the stopping and starting of the motor. It would run when once started by other power, but to get it to start itself was the vexatious point. They finally succeeded, however, and laid a circular track in the shop. On the car was placed a platform or seat to carry one person, and on this I frequently had the pleasure of making the circuit. At that time, at Brandon, was constructed the first electric motor in the United States.

LONG-DISTANCE TALK.—A new land and submarine cable line has just been completed between London and Paris, and a few days ago direct telephonic communication was established between the two cities. The first words over the new line were spoken by the wife of the French Minister of Industry and Colonies, and then a general conversation was held, the line working without any difficulty. The success of this line indicates a future for the telephone which was certainly unsuspected till very recently. It has been believed that only short distances could be covered effectively, and that for remote places reliance must still be had upon the electric telegraph; but if London can talk with Paris over land wires and a submarine cable, it is hardly possible to set bounds to the future of the telephone. Theoretically such will be the case; but in actual practice there are a great many obstacles which it seems almost impossible to overcome, when we pass the thousand-mile post. However, we know that telephony is a progressive science and that great improvements are in store for the future. Who will set bounds to the possible?

THE HORSE-CAR MUST GO.—It is a foregone conclusion that the horse car must go. It is clumsy, slow, uncertain and inadequate. The horse car is unwieldy, and its day of usefulness has gone by. The electric car is being perfected in a manner that invites the confidence of the public. The late severe storm in the East has been an ample test of its power to withstand climatic changes and demonstrated its superiority.

TROLLEY IMPROVEMENTS.—A Western electrician has invented a simple apparatus by which the trolley may be guided without disturbing the connection in cases where changes are necessary. The object is to keep the cars lighted during the operation.

POISONOUS WALL PAPER.—Since the poisoning in the house of the Mayor of Boston has become known, it is said that experts are making it a business to test the wall paper in the houses of nervous people in that city.

ENGINEERING NOTES.

THE LARGEST RAILROAD CORPORATION IN THE WORLD.—The Pennsylvania company's system of railroads is composed of no less than 120 corporations; certainly a colossal aggregation to be under the management of one head. President Roberts in his last annual report says that with few exceptions all these corporations are in good financial condition and are earning fair returns on the capital invested. They represent 7915 miles of railroad and canal, and have a share and bonded capital of over \$700,000,000. They earned in 1890 more than \$133,000,000 gross and moved over 137,000,000 tons of freight and 84,000,000 passengers. In 30 years on the lines east of Pittsburgh & Erie the increase in gross earnings was over 800 per cent and in net was more than 200 per cent. The cost of the securities of other corporations now held by the Pennsylvania was \$113,183,734 and the direct revenue from them last year was \$4,439,404, which is in excess of the total funded debt of the Pennsylvania railroad. In connection with the above figures the report of the London and Northwestern for 1890 is interesting. Its authorized capital is £110,077,934, or, figuring the pound at \$4.85, \$533,877,979. On this the gross receipts from traffic were \$29,651,339 and the net, amounting to \$16,199,117. Dividends at the rate of 4 per cent were paid on the guaranteed and preference stocks and of 7½ per cent on the consolidated stock. The amount of these stocks is £77,107,233. The mileage of the system was 1916½ miles. It will be seen that although the mileage of the Pennsylvania system is 7915 miles, which is just about 6000 miles more than the London and Northwestern, the capitalization of the two companies is by no means so far apart, that of the English corporation being \$533,877,979 against \$700,000,000 of the Pennsylvania. These facts should not be forgotten when the results achieved in both countries are under discussion.

WHAT IS AN "ENGINEER"?—A quiet agitation regarding a narrower limitation to the word "engineer" has again been started in engineering circles, with the prospect that some definite action will be taken in the matter by interested members of the profession. "Engineer" as a term of significance is too ambiguous. It may mean a mechanical draughtsman, a bridge-builder, a patent counselor, a machinist in charge of a stationary engine, a locomotive operator or follower of a dozen other pursuits. The words "locomotive" and "mechanical," for instance, when modifying "engineer," respectively characterize a trade and a profession, a subordinate and his superintendent, yet both are engineers. One or the other should do the graceful thing and yield. If the locomotive engineers are willing to take the initiative they might choose to be called "locomotivists" or "engine drivers," or even "motomeers," the official title of electric operators. But if the professional men should be asked to give up their birthright, what characteristic term could they adopt which would embrace the tri-personality of the mechanical, civil and electrical engineer? It would at best be pseudonymic, for "engineer" should designate the profession and not the trade.—*Railway Age*.

THE SIBERIAN PACIFIC RAILWAY.—The Russian Committee of Ministers, to whom the question was referred, had decided to build the Siberian Pacific Railway within the next six years. The Minister of War has concurred in the above resolution, and Russian engineers rejoice at the prospect of abundant work. The fulfillment of this promise means that a journey of about one month overland will take the traveler from St. Petersburg to Japan. According to the latest accounts, however, the first lines of railway built will only unite existing waterways, leaving the connecting links of rail to be put in later. The west starting point of the system would be at Tomsk, which is now connected by rail with European Russia. The line to Irkutsk, close to Lake Balkal, would be 940 miles long. Another line of about 60 miles would connect the southeast end of the Lake with Zhetysay, on the Amoor river; and 230 miles of rail would connect Srasakajia, on the lower river, with Vladivostok, on the sea of Japan. The total length of rail and water route would be about 5000 miles.

ELECTRIC ROADS IN THE UNITED STATES.—There are now in operation in the United States 260 miles of electric railroads, which is five miles more than those operated by cable. With reference to the mileage of city railroads, it is said that the returns from 286 roads give a total mileage of 3151 miles, which is an increase of 1462 miles since 1880, or at the rate of 146 miles per year. Sixty-one miles are operated by steam on elevated structures and on surface roads. Philadelphia has the largest mileage, 283; Boston next, 200; then follow Chicago with 184; New York with 177, and Brooklyn with 164. Chicago has the greatest length of double track, 176 miles; New York next, 161 miles. The total number of street railroads in independent operation at the first of the year was 807.

THE MANCHESTER SHIP CANAL Co. has expended over \$45,000,000. More money is wanted at once, and it is stated that the City Council of Manchester will advance the \$10,000,000 needed to complete the canal. The

money must be secured by August 15th next, otherwise the men must be discharged and the plant, valued at \$5,000,000, will be idle.

USEFUL INFORMATION.

IS REDWOOD INFLAMMABLE?—Quoth the San Jose Herald: "In protesting against the rate of fire insurance in San Jose, the point that our buildings are almost exclusively built of redwood should not be lost sight of. In cities where pine is used for buildings, the rate of insurance should be far higher than in San Jose for that reason. Redwood is very nearly non-combustible, while pine will burn on the slightest provocation. It is not likely that the committee appointed to present the case to the managers of the insurance compact will forget this point, but it is well to keep it before the public generally, since if we have a local insurance company, we want to make the losses as light as possible, and this can best be done by building exclusively of redwood. The difference between pine and redwood in the matter of combustion has been demonstrated time and again. It is almost impossible to burn a redwood building. If it catches fire, it smolders and chars and is quickly and easily extinguished, while a pine building, once fairly on fire, is doomed to absolute destruction." The story about the uncombustible redwood is a very old chestnut and would be good if only it were true.

NEW USES FOR AN OLD MATERIAL.—Peat, used for fuel from the earliest times, and long known to be of great value as a fertilizer, now finds so many other applications that its preparation has developed into an industry. Peat powder is serviceable, not only about stables but elsewhere, on account of its absorbent and somewhat antiseptic properties and low cost. A few years ago a French surgeon introduced this powder, treated with antiseptic solutions and contained in a cloth bag, as a dressing for wounds. The idea, said to be a very old one among the working people of some places, was improved upon by another medical man of Paris, Dr. Redon, who made a soft and pliable wadding of peat. Other dressings have since crowded these out of hospitals, though the peat applications are coming into use and gaining in favor among veterinary surgeons. Dr. Redon's wadding has yielded important results by leading to many efforts to produce woven fabrics, so that peat is now made into mattresses, coverings, carpets, etc., which are esteemed on account of their power of absorption.

DETECTING OLIVE OIL, BUTTER AND OLEO-MARGARINE.—The reagent employed is a solution of silver nitrate at 25 per 1000 in ethylic alcohol at 95°. About 12 c.c. of the oil in question and 5 c.c. of the reagent are placed in a test tube. The tube is then set in a beaker of boiling water, and the changes of color which take place in the liquids are watched through the glass. Unless the oils are perfectly limpid, they must be previously filtered. Olive oils sooner or later take a fine green color, which is lighter in the superior qualities. Pure cottonseed oil is turned completely black. Oil of earth nuts (*Arachis*) takes first a red-brown color and finally turns green, losing its transparency. Oil of sesame takes a deep red color and remains reddish. Oil of colza takes yellowish-green colors and becomes turbid. Natural butter preserves its natural color. Oleo-margarine becomes a brick red, which color may be detected even in samples containing as little as five per cent of margarine.—*Rauel Brulle*.

SAWDUST seems coming to the front most wonderfully in various ways. The *Brick, Tile and Pottery's Journal* says that a French writer recommends the use of sawdust in place of the hair usually mixed in mortar. He made a composition of two parts sawdust, two parts of lime, five of sand and one of cement, which he alleges is very firm and will not peel off. It also states that the Technical Royal School at Charlottenburg has been making a series of experiments with sawdust, and has now proved that it can be used as building material. The sawdust is mixed with certain refuse mineral products, and compressed with a pressure of 1,500,000 kilograms, to the quadrimeter into the form of bricks. After this treatment, the sawdust forms excellent building material, very light, impervious to wet and utterly non-inflammable. A slab of this substance was placed for five hours in a coal fire, and came out of the test intact.

ENGLISH OPINION.—It is rather satisfactory to learn that British naval architects entertain a good opinion of some of our recent additions to the navy, conceding that they quite equalled and sometimes surpassed European constructions of a like nature. There is no doubt that if Fate should decree that the 7300 ton commerce-destroyer, which Secretary Tracy regards as the ideal naval vessel, six of which could sweep the commerce of any country from the seas, should be constructed at this port, she would make a speed of more than 21 knots and have boilers that would give better satisfaction than some of the cruisers on the other side of the Atlantic have been giving recently.

A TABLESPOONFUL of powdered alum sprinkled in a barrel of water will precipitate all impure matter to the bottom, says the *Pharmaceutical Era*.



A. T. DEWEY.

W. B. EWER.

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SAN FRANCISCO:

Saturday, March 28, 1891.

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(NEW THIS ISSUE.)

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See Advertising Columns.

Passing Events.

The topic of the day all over the country is the attitude of the Government of Italy toward our nation in connection with the recent occurrences at New Orleans, and the subject is being discussed in all its hearings. Whatever the outcome may be, it will result most probably in more attention being given in the United States to naval affairs and to foreign immigration.

The striking of the gravel channel in the Bald Mountain extension drift mine, Sierra county, is important to that section. Much time and money have been spent in the long tunnel, and every one will rejoice that the persevering miners are about to reap their reward.

The successful manufacture of cement in San Diego county is of great importance to our industrial progress. We now import some three million dollars worth of cement annually to this State. A good lime product is preferable and ought to be cheaper.

The North Bloomfield Mining Co., which was dependent on the famous debris suit, has applied for a modification or suspension of the injunction on the grounds that the conditions of mining are so changed as not to now constitute a nuisance.

New State Laws.

Among the numerous laws enacted by the Legislature, there were very few affecting the mining interests, and still fewer which had any connection with industrial affairs. Of those which will interest the mining and industrial classes may be mentioned the following: Repealing the Act declaring the Klamath river navigable. This is very favorable to the miner of that region of Northern California, where hydraulicking may now be carried on without fear of damage suits. Amending Sec. 394 of the Code of Civil Procedure and providing that when an action is brought by a county against citizens or a corporation in another county the action must be transferred to a county other than the plaintiff. This is known as the Hydraulic Mining bill. An Act relating to and enumerating the navigable streams of the State. An Act providing for the support of the State Mining Bureau. An Act relating to the working of rights of way, the easement of drainage in mines in the State of California.

In addition to these enactments, the Legislature provided for permitting electricity to be used to propel cars through the streets of cities; to include roadways used for traction engines in the provisions of the law of eminent domain; to preserve, protect and improve the Sutter Fort property; authorizing a vote of the people to issue \$600,000 bonds for a Union ferry depot at the foot of Market St., S. F.; appropriating \$300,000 for the World's Fair.

Laws affecting the general interests of the State include one making it illegal to advertise for obtaining divorces, and making train-wrecking punishable by death. There is also to be a Board of Arbitrators to arrange differences between employers and employees.

The semi-annual payment of taxes is now provided for by law. The taxes on all personal property and one-half the taxes on all real property are payable ten days after the second Monday in October, and will be delinquent on the last Monday in November. The remaining one-half of the taxes on real property is payable after the first Monday in January, and becomes delinquent on the last Monday in April. All the taxes can be paid when the first installment is due.

Another measure which should be held steadily in mind provides that at the next general election the people shall vote whether or not the United States Senators shall be elected by popular vote instead of by the Legislature. Recent experience in this State and in other States argues strongly that the present method is wrong in theory and outrageous in practice.

California Cement.

For a number of years we obtained a small amount of cement from Benloia, but the works there shut down a long time since. Then the cement works at Santa Cruz were started, but trouble of various kinds overtook the company and nothing has been done for some years. Now a new enterprise for making cement has been started in San Diego county by the Jamul Portland Cement Works. Considerable money has been spent in the purchase of a plant, gravity railroad, etc. The Jamul Works are turning out 100 barrels a day, but it is proposed to increase this output to the total consumption of California, which at present reaches over 1000 barrels a day. A large force of men is employed at the works, and the deposit of raw material in sight said to be very great.

The use of cement in this State has always been large. The cable railroads alone use immense quantities in constructing their tubes, and we use it very largely for sidewalk and building purposes, in default of cheap stone. For sidewalks in the coast and interior towns, its use is becoming almost universal. We have been importing annually about \$3,000,000 worth of Portland cement, so there is a very good market for the home product, provided its quality is satisfactory. Deposits of the volcanic stone from which this cement is made might be sought for diligently, for they are valuable.

AN ELECTRIC RAILWAY.—Work has been commenced on Stuart and Market streets in laying the roadbed of the S. S. Electric Railway, which will run from San Francisco to Baden, a distance of over 10 miles. When completed, the new road will have connection with the ferries by a switch.

War Ships and Fortifications.

Whatever may be the result of diplomatic correspondence going on between this country and Italy, and the friction between the nations growing out of the New Orleans trouble, there is one thing pretty certain, and that is some war-ships will be built by the United States. It has been difficult for representatives of central or interior States and Territories to see the necessity for coast defenses and first-class war-ships, but the action in the past few days has been humiliated by the knowledge that Italy possesses some 24 first-class vessels of war and we have not a single one to oppose them. We have plenty of cruisers, new and fast, and more being built, but nothing which could meet a first-class modern vessel of war like some of the Italian ships. The fact has also been brought plainly before us that our great maritime cities are ineffectually protected with harbor defenses.

This little "war-cloud" has brought home to us a realizing sense of our deficiencies in the matter of ships and forts. Congress will doubtless proceed at the earliest opportunity to remedy these deficiencies. The nation is rich enough to afford such things and their construction would involve the employment of large numbers of men for some years and the spending of great sums of money among industrial establishments.

Another thing, too, the events of the past week are apt to bring about still further changes in our immigration laws and a closer scrutiny of the class of people coming from abroad to take up their abode with us.

Platinum.

We had a conversation this week with Mr. H. M. Raynor of New York, a gentleman who has for many years been in the business of refining and handling platinum. This metal has advanced quite 100 per cent in price in the last 12 months, and is now worth almost as much as gold itself. The metal sold at \$7.50 per ounce last winter and by May was selling at \$15 per ounce, being even a little higher than that at present. There is a very much increased demand for it, owing to its extensive use in electrical appliances, especially in incandescent lamps. The imports of platinum now amount to about \$900,000 per annum, while it was not so very many years ago that we only imported \$100,000 worth.

There is plenty of platinum in the Ural districts of Russia, and that country has met the increased demand. Still, part of the increase in price in the last 18 months is due to the appreciation in value of the paper rouble of Russia, as we have to pay now a much higher rate of exchange in our purchases of the Russian material.

Another cause for the increase in value is the change in the Russian policy of mining. The platinum was formerly sold as a by-product of the gold mines, but a few years since they began to charge a certain proportion of the expenses of mining to the platinum and it is a by-product no longer.

The Russian metal as it comes from the black sands is in combination with iridium, palladium, osmium and other metals, and when refined only about 80 per cent is pure platinum. That from this coast is, however, still poorer, yielding only about 50 per cent pure metal. It varies in percentage, therefore, as does gold from different localities in its value per ounce.

The platinum from the United States comes from Northern California and Southern Oregon, occurring in the black sands associated with the auriferous deposits. Most of it comes from the black sands of the sea beaches. The supply from here varies greatly in quantity. The miners do not take the trouble to save it that they should, though with this great increase in price it would pay them well to look after the platinum in the sands. The river and gravel miners of the regions mentioned should see to this.

More platinum is obtained out of a given bulk of the Russian than any other. That which comes from South America is better than the California or Oregon product; but at present prices it will pay our gold miners to look after the platinum as well as the gold.

We received in San Francisco last month from the Hawaiian Islands, 87,203,900 pounds of aogor.

The Lick Observatory.

As has always been understood by those who knew of the workings of the Lick Observatory, the maintenance fund is insufficient. Mr. Lick gave \$700,000, and the observatory cost \$600,000, leaving only \$100,000 for its support. This income is entirely inadequate, and the institution has been and is a source of expense to the University of California.

A telescope and set of instruments by no means make an observatory. Skilled assistants are essential. The Lick Observatory has but five observers, while Greenwich has 20, Harvard 36, Leipzig 16, Paris 17, Rio Janeiro 16 and Washington 19. Prof. Holden has addressed the Regents of the university on this subject, calling attention to the necessity of more assistance. He says:

"What is now absolutely required is a photographic assistant of ability who shall also be a skilled astronomer, at a salary of \$1800 per year, and a computer at \$700 per year. A capital of \$50,000 would be required to yield \$2500 of interest, and it is desirable that \$60,000 should be provided, in order to allow for small increases of salary as the assistants become more skilled and more valuable."

The professor hopes that some one of means who has an interest in the great work being done on the summit of Mount Hamilton may make provision for these wants of the institution.

"I have said nothing here," continues Prof. Holden, "of certain hindrances due to our isolated situation or of other work which regularly goes on, such as observations to regulate the clocks and to send out accurate daily time signals; the care of controlled clocks and earthquake instruments in the observatory; the keeping of meteorological observations; the maintenance of our electric lights and batteries, the care and cataloguing of the books of our library; the clerical and mechanical work of a large establishment; the regular reception of 7000 visitors per year; the publication of the work of the observatory; the correspondence which keeps us in relation with other astronomers and helps us to direct the thoughts of hundreds of inquirers and of the members of our Astronomical Society."

The Dodge Improved Rock-Breaker.

One of the heaviest items of expense in maintaining rock-crushers has been that of replacing the jaw-plate. The pin-plates of the Dodge crushers are made of cast-steel, studded with pins of a special steel, which is tempered carefully with reference to their use in the crushers. These pins when first inserted are left flush with the surface of the plates, but the plates, being softer than the pins, wear away more rapidly and leave the pins projecting. Attention is also called to the self-adjusting journal boxes, held in place by steel springs taking up all lost motion in pitman, when the eccentric is worn out of round. These new arrangements common to both Dodge and Grant rock-breakers, not only insure longer life to the wearing parts, but also a more economical application of the power to the work. The improved breaker shown in the cut is especially desirable for fine crushing. The system of construction provides in this breaker for ready positive adjustment for finer or coarser particles as desired. The Parke & Lacy Co. of this city are manufacturers of these machines.

MOLDERS LAID OFF.—The recent action of the Molders' Union in withdrawing its members employed in the Pacific Rollog Mills has been more reaching in its consequences than was at first anticipated. Fourteen union molders were laid off at the Atlas Iron Works, Tuesday, because the foundry can at present turn out no more iron castings for the rolling-mills, where work has been crippled by the strike. The laying off of the molders at the Atlas Works will also throw more than 100 machinists and helpers out of employment. In all, at least 400 or 500 men are affected by the extension of the molders' strike to the rolling-mills.

COAL is reported as having been found on Sutro's land out near the ocean, on the peninsula, and also on the opposite shore of Marin county. But such finds in these localities are apt to "peter out" like the gold discoveries made several times in the same region.

Remarks Upon Judson Dynamite.

[Written for the Press by MARK B. KERR, Member A. I. M. E.]

The Judson Dynamite and Powder Co. has just issued a circular to mine-owners and practical mining men, proposing to put within the reach of every one interested in mining a high explosive at the least possible cost to the consumer. In reading over this circular, sent from the office of the company, 18 California street, it is noted that the stockholders and directors are all men actually interested in the development of the mineral resources of the country.

This organization recalls to mind the recent powder complications in which the other companies, the Giant, the Safety-Nitro, the California and the Vigorite, lately comprised a powder pool called the Associated Powder Companies.

It is not the purpose of this paper to enter into the reasons for the establishment of the Judson Dynamite and Powder Co., the direct cause of the breaking of the powder pool early in January, which has ended in each company acting independently and in its own interest, but rather to mention many new and interesting points that the writer was enabled to glean through the courtesy of Mr. E. G. Lukens, president, and Mr. C. D. Kennedy, superintendent, during recent visits to the new works of the Judson Dynamite and Powder Co. at Nobel, Alameda county, California.

In investigating dynamical geology, one of the most interesting divisions of science, who among us but must of necessity look in silent admiration at those immense volcanic uplifts, which have even recently metamorphosed certain portions of the earth's crust, and torn asunder gigantic fissures, where imagination runs riot in endeavoring to determine the limits of these incommensurable forces. But when a body of men band together to convert into practical use the powers of nature by obtaining a force and attempting to even rival volcanic outbursts, we view their enterprise with admiration, and meet their efforts with encouragement.

Many conflicts have arisen as to the history of the invention of gunpowder, but it is now generally conceded to have originated in the Orient, although there seems no doubt that its introduction into Europe is due greatly to the efforts and experiments of the monk, Berthold Schwartz.

Dynamite is of very recent origin, Nobel, being the first to make practical use of the admixture of nitro-glycerin with infusorial earths which at times is still manufactured, although the present formulae for nitro-glycerin powders differ greatly, being the exclusive property and secret of those manufacturing it.

To mining men, the most interesting point in the manufacture of dynamite is the amount of compression, or the amount of force (expressed in foot-pounds), needed in making a desired compression. The principles and instruments in use by the Judson Co. are much the same as those described by Lieut. W. R. Quinan in his able report on Vigorite powder, but to enable the reader to obtain a clear idea of the methods, the following description is given:

The instrument (Fig. 1) consists of a large cast-iron block, the size of an ordinary blacksmith anvil. A rectangular hole is cut through this block of sufficient height to readily slide in and out, the leaden plug (L). A platen, resting on the plug, projects above the top of the machine (P). The charge of dynamite to be tested is put upon the platen, and upon this is placed the weight or shot, through which is run a fuse with a fulminating cap (W). When the powder is detonated, the weight is blown off and the lead plug compressed. The plug is measured before and after compression, and the difference is expressed in inches.

Fig. 2 shows the plug before and after compression, with 60 per cent dynamite.

The following figures give average compressions of both a low-grade dynamite (Triumph) and of a high-grade (60 per cent Judson dynamite) expressed in inches:

Original plug.....	1.000
Size after compression (5 per cent dynamite).....	0.620
Amount of compression.....	0.380
Original plug.....	1.000
Size after compression (60 per cent dynamite).....	0.360
Amount of compression.....	0.640

In noting this result, the compression of the 5 per cent is seen to present a greater proportional average than the 60 per cent, which shows the superior quality of this new low-grade powder. The compression of the high-grade (60 per cent) would be much greater, but the increasing diameter of the plug, caused by the high explosive, must be taken into account in averaging results. Liquid nitro-glycerin gives a compression of .950 of an inch, so that the above seems a fair test. The amount of dynamite used is always one pennyweight.

By simply arranging these results and obtaining a scale for the force, a table is readily made giving compression (in foot pounds) of any grade of dynamite powder.

The Triumph (a dark brown powder) will be especially useful in removing stumps and in

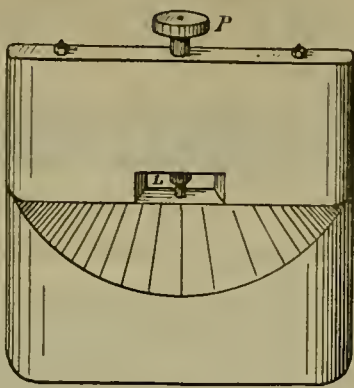


FIG. 1—INSTRUMENT FOR MEASURING COMPRESSIONS.



FIG. 2—PLUG BEFORE AND AFTER COMPRESSION.

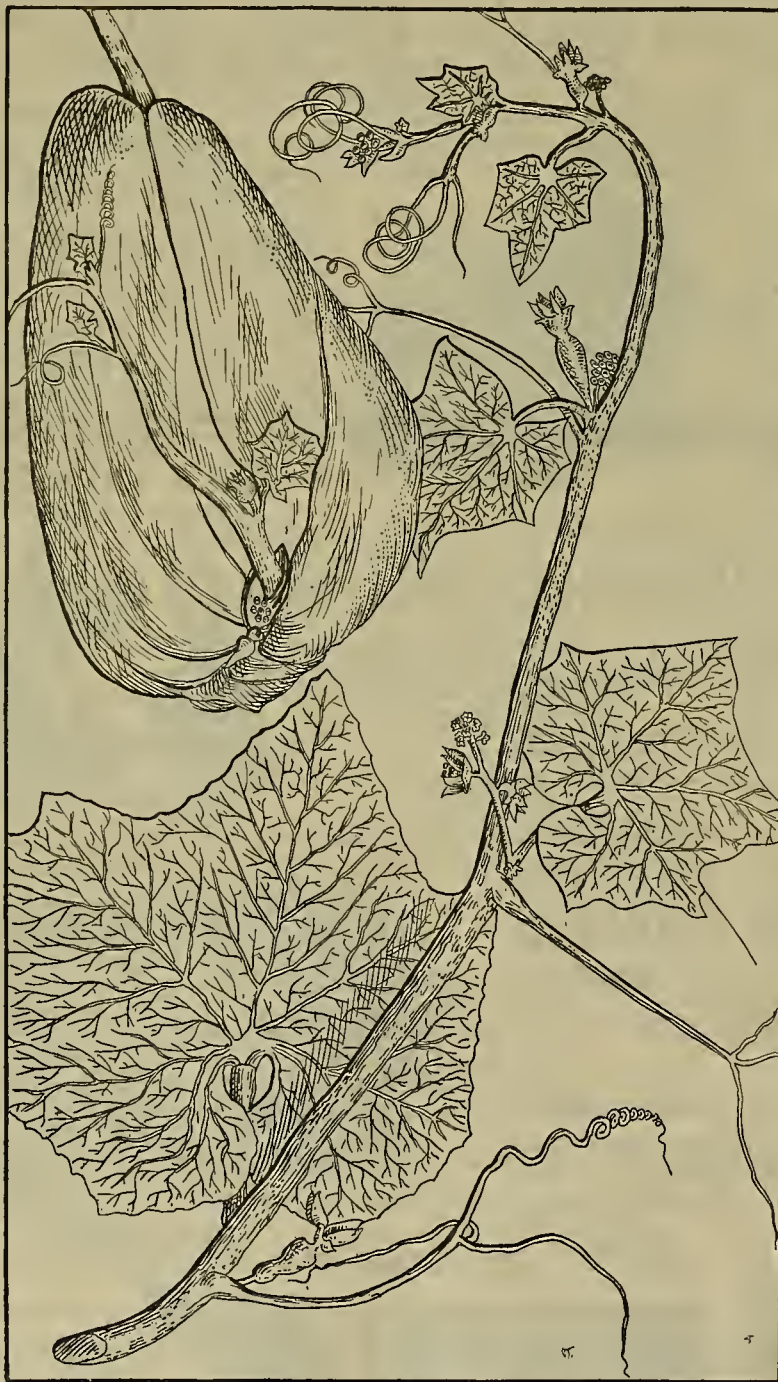
certain character of rock work and in tunnels, where the gases generated being smaller, the comfort of the miner is comparatively greater.

During my visit many other points concerning the Judson dynamite powders were noted, viz.: The various grades from 20 to 60 per cent being tamped in paper cartridge pack solidly; the Triumph, however, being used for lighter work is generally packed "in bulk."

Experiments made in recovering the acid needed in the manufacture of these explosives

very much in favor of these large companies, affording a fair remuneration to the inventor as well as reflecting credit to the State where the equable climate is advantageous to experimentation. In the coolness of the early morning, the nitro-glycerin is prepared, and during the heat of the day the powder is mixed, tamped and boxed.

A compound prepared under such advantageous circumstances must of necessity be uniform in quality, and thus the moral responsibility of the manufacturer is decreased, and he



THE CHOCO, OR CHAYOTA, AS GROWN IN SANTA BARBARA.

have given encouraging results, and at present writing most of the sulphuric acid and a fair percentage of nitric acid is recovered by means of new methods.

In conclusion, it would seem to an observer that California is making and has made rapid strides to the front in the manufacture of high explosives, and that the elements of success are

can safely engage in such a work without running great risks or sacrificing human lives.

The future of the powder industry on this coast is in its infancy, and before long we may look to see this trade extended, especially encouraging since the large capital which has been invested in these new works, notwithstanding the great competition existing. When neces-

sity demands, competition with other countries will begin in the manufacture of a high quality of sporting powder used now in our own munitions both by land and by sea, besides affording aid to the pioneer in his land clearing, the miner in his work with pick and shovel, and the engineer in rock excavation and tunnelling.

A New Food Product.

[Written for the Press by DR. LORENZO G. YATES, F.L.S.]

The Choco Plant (*Sesuvium edule*).—This plant, which has been introduced into cultivation in Florida, where it is growing in favor, and is, perhaps, better known there than elsewhere in the United States, is being tested in Santa Barbara county by Mr. Kinton Stevens of Montecito, who obtained the seed from Samoa, and has one very thrifty vine that promises a large yield of the curious squash-like fruits. *Sesuvium edule* is the botanical name of this plant, but it is perhaps better known as "Choco," "Chocho," "Chayota," and "Portuguese Squash." It belongs to the order Cucurbitaceae, and is a perennial vine, resembling in growth and fruit our summer squash or vegetable marrow. It is a very prolific bearer. Both the fruit and the great yam-like tuber are used as food by man and beast in the West Indies, where it is considered a wholesome article of diet. The roots often weigh as much as 20 pounds. They have a flavor similar to the yam, and are considered a greater delicacy than the fruit which in a raw state resembles the chestnut in flavor, and under favorable conditions weigh over three pounds.

A few of these plants, which in our dry seasons could be easily supplied with water, would furnish a family with an abundant supply of food, and such valuable food plants should be cultivated all over the State, as is being done by the Government in India as a provision against famine in dry seasons and failure of other crops.

Although a native of Tropical America, judging from the plant I saw, it does not seem to be particular as to soil nor require special care.

One peculiarity is that the fruits sprout while growing on the parent plant. The proper way to grow them is to plant the whole fruit, as they have but one seed, and they produce fruit in three months under favorable conditions.

In an illustrated report of the Botanic Gardens of Bangalore, India, there is a figure of the fruit of this plant, but it does not show the sprouting of the fruit, which is shown in the accompanying illustration made from the plant grown near Santa Barbara, nor is this peculiarity mentioned in any publications which have come to my notice; whether this is its normal habit or is due to climatic conditions, I am unable to state. It may arise from the fruits being left too long on the vine; it would probably be advisable to pluck them before they sprout.

Santa Barbara, Cal.

[Our engraving is made from an excellent sketch of the fruit and vine made by Dr. Yates. EDS. PRESS.]

Mining Bureau Museum.

Following are among the recent contributions to the California State Mining Bureau:

Building stone—Shasta county; from the Cal. Sandstone & Contracting Co.

Hematite—Breitung mine, Tower, Minnesota.

Fifteen specimens various minerals including syenite, quartzite, gabbro, breccia, greenstone, etc. from the Lake Mine, Minnesota.

Felsite—Red—From the great Palisade, Lake Superior.

Quartzite—Red—Seskiwith point, Isle Royal, Mich.

Trap—Basaltic, Graod Marias, Minn.

Copper ore—Epiclote, Saginaw mine, Isle Royal, Mich.

Iron Ore—Vermillion lake, Minn.

Auriferous gravel—Mayflower mine, Placer Co., Cal.; D. M. Kent.

Embolite (chlorohomide of silver in cerussite)—Central mine, Broken Hill, N. S. W., Australia; W. N. Folger.

Cerussite (carbonate of lead), with embolite, from same mine.

Silver—Native on pyrrargyrite sulph-antimonide of silver, with azurite and malachite; Broken Hill mine, Australia.

Confederate currency, Mrs. S. B. Hayden.

Talanite-sphene (silico-titanite of calcium)—Renfrew Co., Ontario, Canada; D. R. McKillican.

Stalactites—Mammoth Cave, Kentucky; A. S. Penfield.

Quartz with gray copper, carrying two ounces gold and two ounces silver to the ton—Buster mine, Idaho; S. W. Smith.

Quartz carrying \$100 gold per ton—Cleveland mine, Idaho; S. W. Smith.

The Bureau has also received a number of choice specimens from the Technological Museum of Sydney, N. S. W. Among them are three specimens of gold-bearing quartz from the Peak Hill gold field, and six samples of ore from the Broken Hill Proprietary Co.'s property, one of the greatest mines in the world.

One of the most interesting specimens in the collection is a sample of coal containing fossil resin, something rarely found in coal.

Three casts of gold nuggets come with the collection, one of which in the original was valued at \$4420 sterling. This nugget has been dubbed the Viscount of Canterbury and was found but 15 feet underground at John's Paddock, Berlio, Victoria.

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California Inventors

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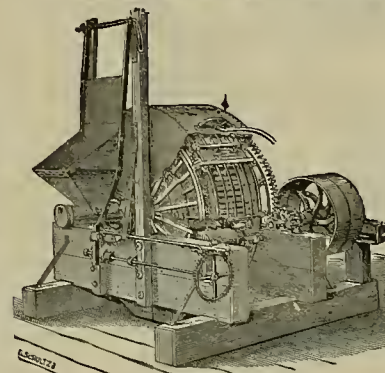
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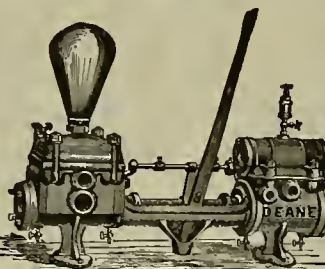
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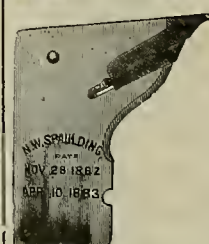
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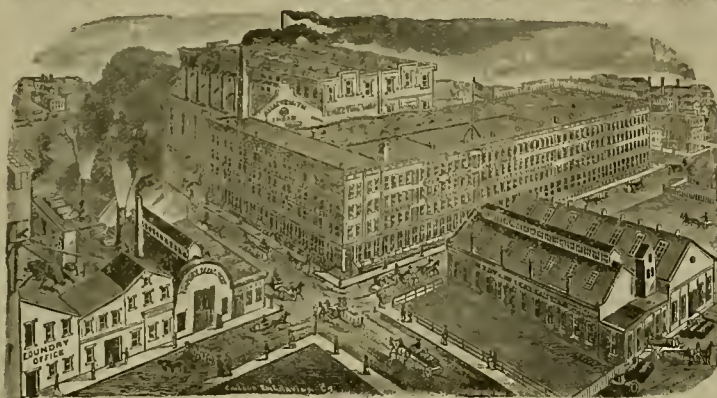
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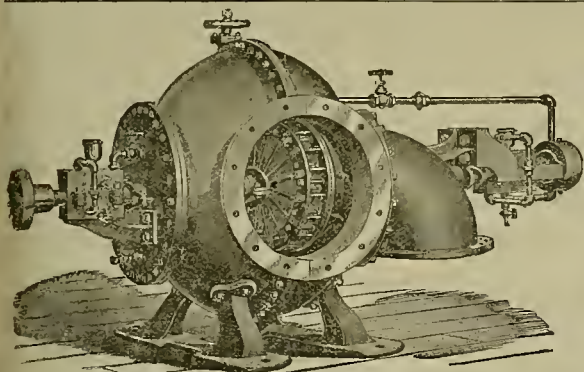
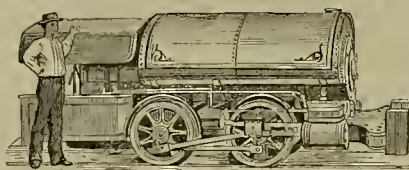
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of U. S. Patents for Pacific Coast Inventors.

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FOR WEEK ENDING MARCH 24, 1891.

026.—PORTABLE ELEVATOR.—N. Anderson, S. F.
064.—MANUFACTURING BORAX.—N. M. S. F.
033.—SWINGING HOSE REEL.—W. F. S. F.
846.—FRUIT DRIER.—A. Conklin, Grants Or.
764.—LATHE.—E. W. Jones, Portland Or.
975.—FLOWER HOLDER.—Jas. Martin, Tem. Cal.
083.—FLUSH TANK.—S. W. Miller, Pasadena, Cal.
993.—ILLUMINATING PANEL IN CONCRETE.—E. L. Ransome, S. F.
989.—GAS ENGINE.—E. Narjot, S. F.
017.—SWITCH STAND.—J. H. Wallace, S. F.

The following brief list by telegraph, for Mar. 24, appear more complete on receipt of mail devices:

010.—Mark Anthony, Berkeley, assignor to the Gate Faucet Company, S. F., faucet for barrels;
011.—Brysch, S. F., electro-therapeutic syringe; Mil. F. Brown and T. E. Salih, S. F., kitchen cabinet;
012.—E. Clawson, S. F., hood for fireplaces; Joseph S. F., newspaper cover; Edwin Falkingham, S. F., and shillier; James W. Harris and T. O. Thomas, S. F., sectional rope sheave; Peter H. Jackson, S. F., condition of buildings; L. J. Johnson, Petaluma, farm Wm. Lacy, Jr., Los Angeles, irrigating hydrant; P. B. Morse, Murphy, ore concentrator; James and W. A. Watson, Stockton, assignor to the Benicia Agricultural Works, Benicia, kang plover; Geo. W. Phinley, S. F., plow; Wm. Teneyck, Oakland, self closing burner; Oregon—Edward W. Curtis, Portland, S. F., engine; Henry Dufresne, Portland, shade ad. J. D. Henry and W. E. Wood, Portland, feed. Edward E. Kingsley, Portland, device for moisture gum on envelopes.

Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail telegraphic order). American and Foreign patents issued, and general patent business for Pacific Coast (more transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s Scientific Press U. S. and Foreign Patent Agency, the following are worthy of special mention:

ILLUMINATING PANELS IN CONCRETE FLOORS.—E. L. Ransome, S. F. No. 448,993. Dated March 24, 1891. This invention relates to improvements in illuminating basements and chambers beneath concrete flooring, and it consists especially in placing the glass directly into the concrete. In placing the glass in concrete flooring for illuminating basements or for dark chambers beneath such flooring, it has been customary to fix the lights in iron or metal plates or frames perforated to receive and hold them in position, and these frames have been set into the flooring, either before or after it was built, so that a joint would exist between the lights and the floor itself, and these joints are difficult to make tight. In Mr. Ransome's improved method he reduces the cost of manufacture, and does away with any joints between the glass or illuminating tile and the main floor, by fixing the illuminating glass or tiles directly into the concrete floor in the process of manufacture, and dispensing with all metal frames or supports preventing any difficulty with joints by moulding the glass directly into the floor itself when it is being built.

SWINGING HOSE REEL.—Wm. F. Bowers, S. F. No. 449,033. Dated March 24, 1891. The invention relates to that class of hose-reels which are secured to wall and are so mounted as to swing, suitable joints being provided to allow the uninterrupted flow of the water, no matter to what position the hose may be turned. The object of the invention is to produce a simple and effective hose-reel of this class.

SWITCH STAND.—John H. Wallace, S. F. No. 449,017. Dated March 24, 1891. This invention relates to that class of switch-stands designed to hold and lock railroad switches and yet permit the movement of the switch-rail, when locked, to move past the yielding resistance away from its adjacent rail to enable the wheels of cars to pass through the locked switch, without leaving the main rail, the point springing back to its place when the wheels have passed through. The invention consists of certain devices and details of construction designed to improve this class of railroad appliances.

PORTABLE ELEVATOR.—Nicklaus Anderson, S. F. No. 449,026. Dated March 24, 1891. This improvement in elevators consists of a framework mounted on wheels, so as to be transported from one portion of a warehouse to another, vertical guides made adjustable in height, a platform suspended so as to travel between the guides, and a means for raising and lowering the platform. This elevator is especially designed for use in houses where grain or other substances are to be stored and where it is necessary to transport the material over the floor and then lift it to a considerable and varying height to reach the point of storage.

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Assessment Notices.

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Location of works, Keeler, Inyo County, California.
Notice is hereby given, that at a meeting of the Board of Directors, held on the 30th day of March, 1891, an assessment (No. 12) of Ten Cents per share was levied upon the Capital Stock of the Corporation, payable immediately to United States gold coin to the Secretary at the office of the Company, 132 California street, San Francisco, California.
Any stock upon which this assessment shall remain unpaid on the 12th day of May, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 24th day of May, 1891, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.
By order of the Board of Directors.
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DIVIDEND NOTICE.
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Borax Company, San Francisco, March 31st, 1891.
At a meeting of the Board of Directors of the above-named Company, held this day, a Dividend (No. 4) of One Dollar (\$1.00) per share was declared, payable SATURDAY, April 10, 1891, at the office of the Company, No. 230 Montgomery Street, Rooms 11 and 12. Transfer books close April 5, 1891, at 3 o'clock P. M.
ALTON H. CLOUGH, Secretary.

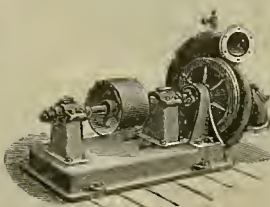
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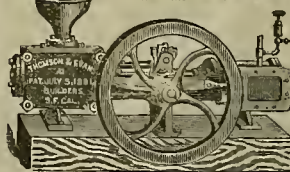
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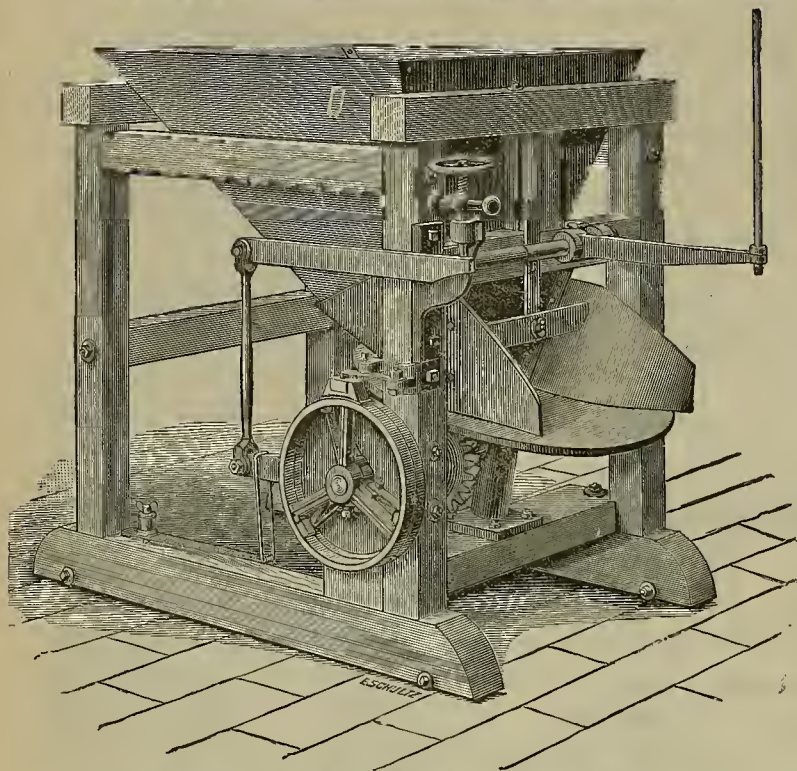
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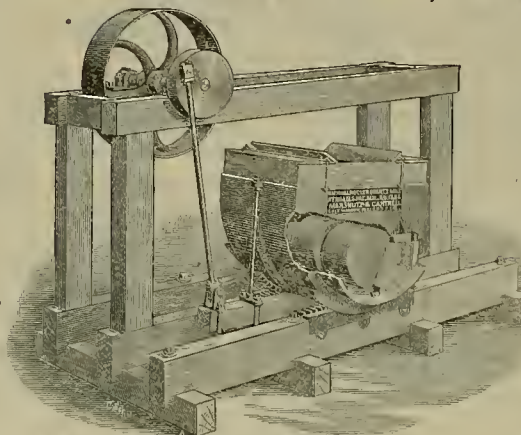
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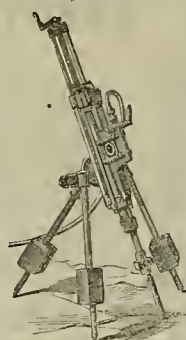
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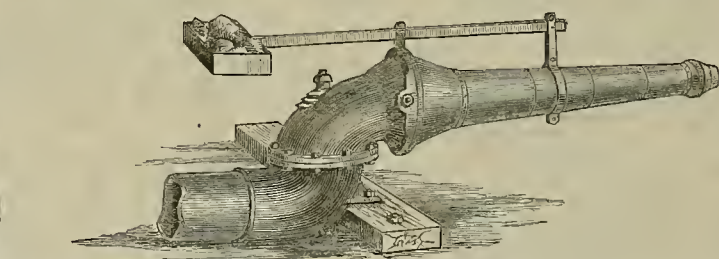
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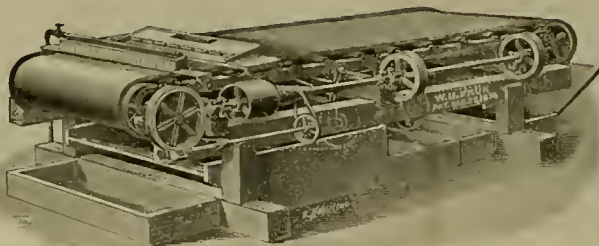
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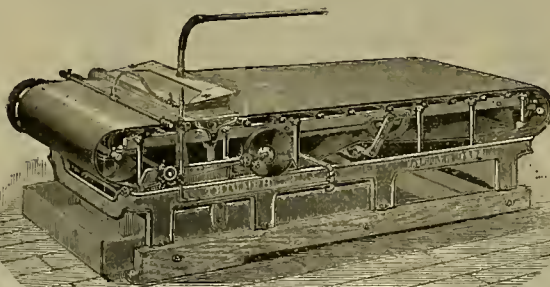
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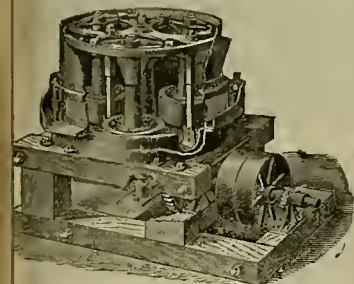
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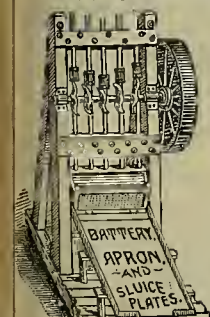
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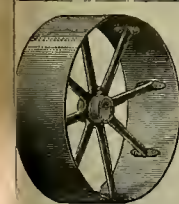
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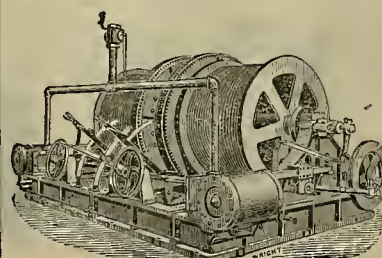
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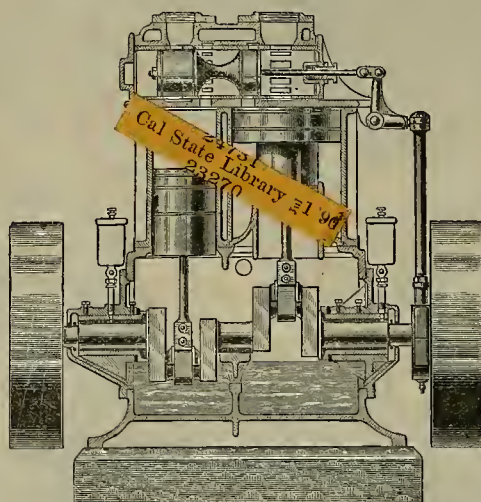
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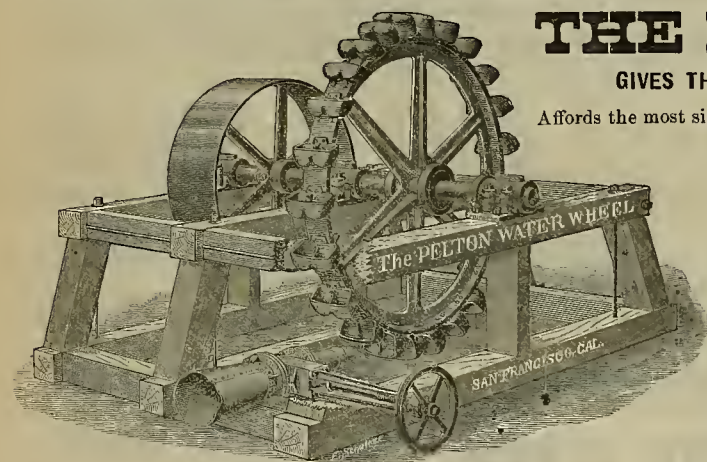
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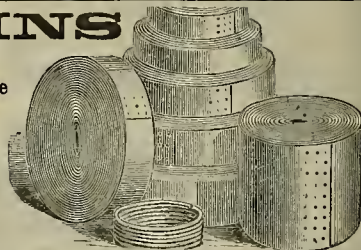
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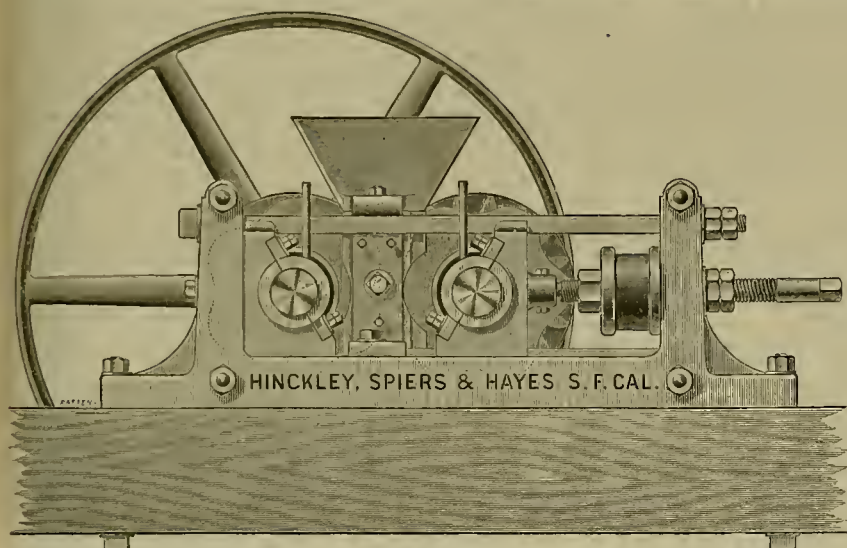
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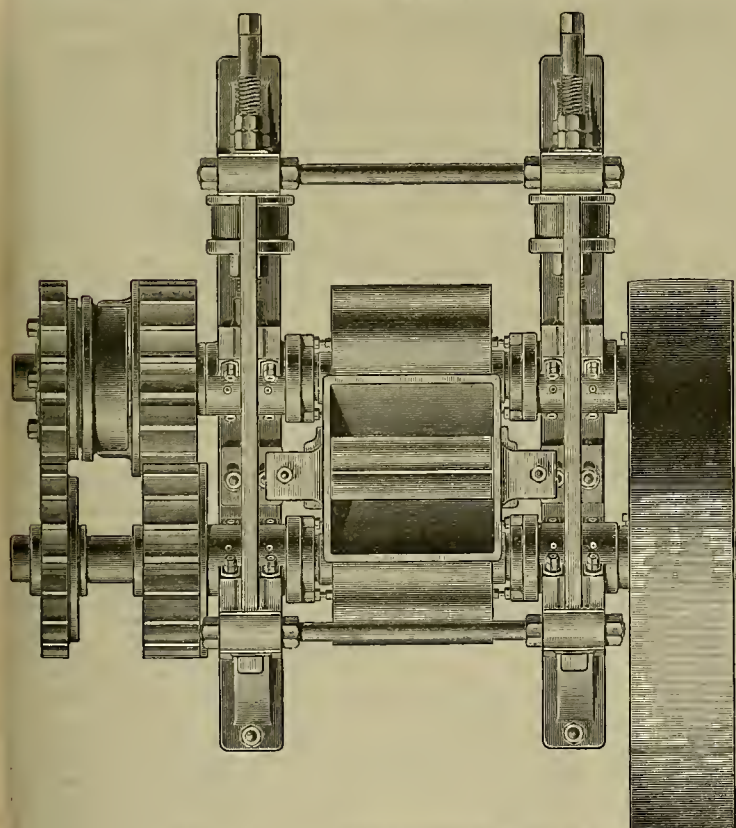
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CORRUGATED ROLLS.



PLAN OF CORRUGATED ORE ROLLS.

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On page 145 of the MINING AND SCIENTIFIC PRESS (March 7, 1891) we illustrated a high-class dry-crushing set of rolls for ore. On this page the engravings show a cheaper form of crushing rolls. These are chiefly adapted to comparatively coarse work, but can also be used for tolerably fine crushing when the rolls are in good condition and the shells are new and of good material. They are not, however, so well adapted to withstand continuously the heavy strain incident to fine crushing as the high-class rolls previously illustrated.

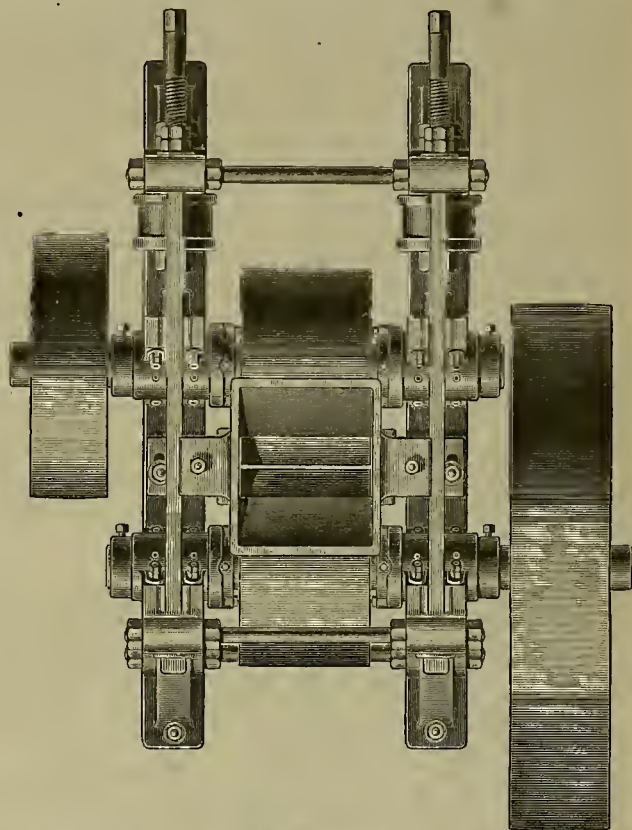
These rolls are also driven by pulleys on each roll-shaft, without the use of gearing.

The corrugated rolls, herewith illustrated, where large quantities of material from a rock-breaker are required to be crushed to a size of about three-quarter inch, give excellent results when well made and adjustable with reference to uniform spacing of corrugations on opposite roll-shells. They also crush the material to the same degree of uniformity as the smooth rolls, and with very little sliming. These rolls are manufactured with a patented appliance for perfect adjustment, so as to obtain uniform width of space between roll-shells for all posi-

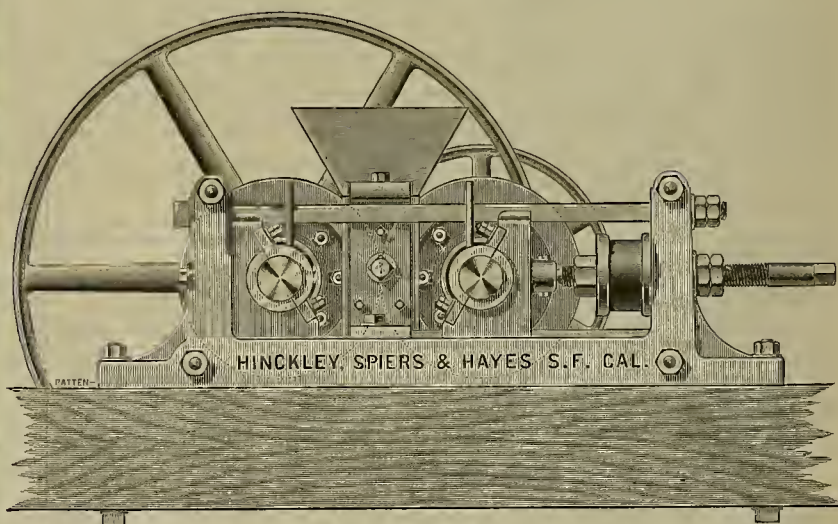
tions during rotation. The roll-shells are made of mild cast steel, and wear a long time before requiring to be replaced.

These rolls are particularly adapted to the second crushing of galena and all ores where a gradual reduction in size is advisable. These forms of rolls, as well as those previously illustrated, are manufactured by the Fulton Iron Works of this city.

TIN.—It is stated that the unselected ores of the Cajalco tin mines, San Bernardino county, yielded at the test run over ten per cent of metallic tin. The present openings in the



PLAN VIEW OF CORNISH ROLLS.



CORNISH ROLLS.

Cajalco mine alone will give a daily output of 100 tons of ore. A large mill and reduction works for working 200 tons per day will be ready for work by June 1st.

DARBY & LAYDON have been awarded, by the Harber Commissioners, the contract for building the first mile of the belt railroad. The price is \$36 775. Work is to be commenced in 30 days and completed in 60.

A franchise has been granted for a double-track railway from San Jose to Alum Rock point, to be operated by Hoskins electro-vapor engines.

CORRESPONDENCE.

We admit, unadvised, opinions of correspondents.—E.D.S.

Loss of Gold.

Practical Tests in Milling the Gold Bearing Rocks.

[Written for the PRESS by ALMARIN B. PAUL.]

It is not an assumption to say that in the past 25 years I have written more on the wastage of the precious metals than any one of my time, at least, within my knowledge. Yet others realize the fact and have done good work in the same direction; notably for California, Henry G. Hanks, Melville Atwood and Louis Blanding. I have written so much on the subject that it may be considered an injury to me, as many deem it a hobby rather than the emanation of deduced facts. There are many writers on the subject of gold, and many assert the fact of a loss, but their declarations are too often assertions, without being supported by actual tests of their own making. Yes, I have written much and expended no small amount of money and time to find out facts about which men who do not spend their time and money do not get at, but think are not so. They are content with the "think," I have shored to know. A man whose life has been spent among the rocks and metals cares but little for the "think" of mankind, and that's my case. To say that silver milling is far in advance of gold milling, with all its improved appliances, is stating a demonstrated fact, too plain to be doubted by those who have had experience in working the two metals. The assertion may be doubted by some who will try and upset the position by asserting that gold has nearly double the specific gravity of silver, consequently it should settle and be taken up more readily, but this is false reasoning, when applied to the bulk of gold-bearing rocks. There are other questions that must be considered. 1st, the atomic character of gold in its matrix; and 2d, the envelopment of rebellious substances. Although my tests heretofore have been many and varied, yet the past year has enlarged my knowledge of loss, and which has increased the wonder that so few give heed to so important a matter, and do not seek to benefit themselves by closer investigation and more careful manipulation.

To overcome this loss has been my earnest study for many years, and to a very great extent I have succeeded. That there is an incredible amount of gold that from various causes float, and is carried off with the water over all machinery, that can be placed to retain it, and which will move on as long as there is the least density of water or agitation of it, I see and know. Some will explain, "we all know that," but the extent of this loss value, the great body of miners do not know.

A very great loss is made from several facts: 1st, the great value of all gold-bearing rocks is in very fine gold; 2d, that you are never satisfied with your milling results when compared with your assays or "think" value; 3d, that failure after failure occurs on good properties because they do not save the metal; 4th, that a rush of water exerts a power to wash off the sands and why not the gold?

It was only a few months ago you published an article from an English writer on the subject of imperfect milling of gold rock, and who asserted that from the civilized world came the same story. I am firmly of the opinion that the free gold product of the majority of all the gold mills, in all our States and Territories can be doubled. This belief is founded on the fact that in all my larger or smaller tests, I never failed in doubling the yield, and in the majority of instances have exceeded it, when testing by the dry way. A friend at my elbow says: "what is the use of your writing these articles?" millmen will not heed them, and why give your knowledge and tests away? While I admit there is force in the observation, yet the gold fields are extensive enough for us all, and my work may be a benefit to some one if not to myself. I cannot but think, however, that it is fooling away time to write these articles, as few believe, and so few heed the assertion of facts made by others, when not in accord with their own ideas; but to the public the ideas go for what they may choose to place upon them. You have the labor and thoughts at no cost to you, and it is for you to seek the truth of them to gain the profit.

As a verification of these ideas of loss, I will here give a few important tests which may be of interest to some of your readers.

One of the tests having a good lesson in it, was the taking up of a given quantity of tailings, water and all, after it had passed from the battery over silver plates, and blanket concentrators, and then over 60 feet of riffles. Water tailings, etc., by measurement, passed off at the rate of 20 gallons per minute. This bulk of material was allowed to rest for 24 hours before the water was drawn off for drying the residue. The tailings were then carefully dried, sampled, and assayed, with the result of \$7.80 per ton. The material was then charged with clear water, and agitated so as to produce what we recognize as muddy water from the batteries. This was then drawn off free of any grit of the tailings, and was also allowed 24 hours for settling, when it was drained, dried, sampled, and assayed, with a result of \$3.65, and this on what could not be considered over \$15.00 rock, as the highest

estimate of its value. The figuring on this test can be summed up as follows: There was passing off from the batteries every 24 hours, 28,800 gallons, a loss of about 1/4 of a cent per gallon of water and tailings, equaling \$72 per 24 hours, an amount a small fraction less than \$5 per ton for quantity worked, and this after the sulphurets had been taken up.

For another test, 100 tons of rock were crushed by the battery, without regard to amalgamation, either in the battery or on silver plates, or concentrating the sulphurets. The material as crushed passed to a tank (No. 1), from No. 1 to tank No. 2, from No. 2 to tank No. 3 (now as muddy water), from No. 3 to tank No. 4, from No. 4 to No. 5; the water from No. 5 was then used as required by arrastras. Tanks No. 1 and No. 2 were not sampled, as they contained the bulk of the material and value for working in arrastras. Of all the rock crushed, about 16 per cent passed into tanks Nos. 3, 4 and 5; these were carefully sampled and assayed, with the following results: Tank No. 3 gave \$5 per ton. Tank No. 4 gave \$4.85 per ton. Tank No. 5 gave \$3.40 per ton. Muddy water taken from the pipes gave a residue, after evaporating the water, that assayed \$3.30 per ton. Of course there was but very little of this, yet enough to show that gold was still passing on. The size of the above tanks averaged about 250 cubic feet each.

This test was on what was considered low-grade ore; on higher grade, no matter how free the gold (say \$12 to \$20 and higher), the loss in muddy water would be possibly equal to the amount saved by the best manipulation, by battery and silver-plate working, wet. Of course this cannot apply to what may be considered grain gold or specimen rock.

Another lot of over 200 tons, crushed by battery, with all ore run into tanks for arrastra working, and having the muddy water passed on into two other tanks, each 8x17.3 feet deep (inside measurement), gave an interesting lesson as follows: From tank No. 1, receiving the muddy water, it flowed into No. 2 at the top of tank. Taking the two tanks, there was retained 16 per cent of all material crushed, tank No. 2 having one-third of tank No. 1.

The value of tank No. 1 showed by assay that it contained 15 per cent of the full assay value of the material crushed, while tank No. 2 gave 12 per cent, leaving off fractions.

Another very surprising, and yet very practical test, is the following: I took 90 tons of ore for working, part by battery and silver-plate amalgamation, then concentrating on blankets, part by arrastras, wet working, but with the ore crushed dry.

Then 30 tons by dry reduction and dry amalgamation, with the following results: The battery and silver plates gave a yield of \$9.4 cents in free gold per ton, with concentrations not exceeding \$2.50 per ton of ore reduced, making a total of say \$3.10 per ton. The dry ore worked by arrastras wet, gave in free gold a yield of \$6.46 per ton.

The 30 tons worked by dry reduction and dry amalgamation gave \$3.36 per ton in free gold.

A whole page I could fill of similar tests, but these alone should settle in the minds of all that the wastage of gold by our general wet working, slashing system is enormous when we consider the great number of mills thus operating in all the States and Territories.

I do not say that on all ores the same results would be obtained, but in proportion as is the per cent of atomic gold will be the per cent of loss. When I assert that it is my opinion one-half of the free gold is washed off by the slashing battery wet process, taking all the gold-mills as one, you will see I have much for backing that opinion, for these, as puzzling as it may seem, are cold figures and solid facts.

Taking an experience of over 40 years in mill working for gold, I must say that I am clearly convinced of the following facts:

1st. That all gold rock for gaining a proper percentage should be pulverized dry no matter how treated afterward.

2d. That dry amalgamation is the most perfect of all systems of amalgamation.

3d. That where water is used, slow-motioned arrastras are the most efficient amalgamators.

4th. That take the general run of gold rock, the arrastra is the most profitable. On high-grade rock, carrying fine gold, the dry way is most profitable.

It is these convictions that have forced upon my mind, the effort and labor of perfecting both plans.

As before stated, I say to the miner, you have the labor and thoughts at no cost to you, and it is for you to seek the truth of them to gain the profit.

Ophir, Placer County.

[From Our Traveling Correspondent.]

EDITORS PRESS:—The Eclipse mine, which started off with most flourishing prospects, has been attached and at the present time is tied up.

The Hathaway

Is owned by Messrs. Valentine Broa, G. F. Taylor superintendent. At present the mill is shut down while the shaft is being put down to 350 feet. This will give the mine 150 feet of new stops. The shoot has been worked for a length of 1116 feet, the vein carrying an aver-

age width of 2 1/2 feet of quartz that goes from 2 to 3 1/2 per cent in sulphurets of a value of \$125 to \$175 a ton. The vein matter averages \$7.50 in free gold, while the total value saved out of the quartz is \$9 a ton. The ores of the section are such that a good percentage of the ore's value escapes in working. The Hathaway will start her stamps to dropping about the middle of April.

Gold Blossom.

E. L. Hubbard and C. F. Reed are owners of this mine. It is located about 1 1/2 miles west of Ophir. The main shaft is down 210 feet, with two drifts of 150 feet each. The vein averages three feet in width. The quartz carries three per cent of sulphurets that go \$250 a ton, while the average value of the ore is \$25. Of this but about 25 per cent is saved, making the mine a three-foot vein of \$6 ore. The mine has a ten-stamp mill with concentrators. The property consists of four locations, or 6000 feet on the vein. Half a mile east of the mill a cross-cut tunnel has been run that cuts the vein 100 feet. The vein is being drifted upon at this point. The ore is of the same character as in the shaft and the vein is four feet wide.

Boulder.

J. B. Brown, F. and J. Kaiser and Dr. M. Schnabel are owners of this mine. The property covers 1000 feet on the vein. The shaft is now down 112 feet and a drift run 180 feet on the vein to connect with and drain the shaft.

The average width of the vein has been 3 feet of quartz; 300 tons have been milled that gave an average of \$6 a ton in free gold. In addition to this the vein carries one per cent of sulphurets that go \$300 to the ton.

The bottom of the shaft is in very rich rock. Three-fourths of this mine will be sold for less than the value of the ore in sight. There is no boom in Ophir, but the promise of steady, quiet, successful mining. The work of the past was in the rich pocket leads; that of to-day in the milling ore veins that were discarded in the past. The Hathaway has shown that the vein goes down, the ore bodies are long and of good grade and veins of sufficient size to make their working profitable.

E. H. SCHAEFFLE.

Placers in Sonora, Mexico.

EDITORS PRESS:—Much interest has been manifested, among vein and placer gold miners, in the interesting accounts you publish, from time to time, of the successful extraction of gold by the miners in Southern Africa, as well as in Australia.

To the mind of most American miners, these are remote localities, expensive to reach, and under Governments so dissimilar to our own that the temptation to American venture and enterprise in either of the above regions is very slight indeed.

With this in view, and the gradual lessening of the gold returns from California, I have thought that some accounts of mines and placers nearer home might not be uninteresting to your many readers, particularly if located in a country not subject to the ban laid upon the State and most of our hydraulic miners by the "Debris laws."

I write this from personal experience alone, and shall advance but little of history and tradition, and then only desire them to be taken for what they are worth.

In the northwestern part of the State of Sonora, Mexico, and southerly about 15 leagues from the city of Altar of that State, lie the great gold placers of Los Llanos and La Cienega. Briefly, the discovery of these placers was made, in the year 1803, by Don Teodoro Salazar, with a party of soldiers, while in pursuit of hostile Indians who had been depredating among the cattle ranches in the vicinity. Gold was found in great abundance scattered over and among the sands that covered the ground of the gradually sloping plains lying at the base of the mountains of San Francisco, whose trend is almost due east and west, that of the placers being due north. The gold first taken from the plains was in size like grains of corn and from that to hickory nuts, the "chispas" ranging sometimes much larger, authentic accounts describing some to weigh as high as 25 pounds.

The extent of the placers of Los Llanos was about 3x4 leagues, and one can readily imagine that they were soon the scene of a busy population running well up into the thousands. The one great drawback, though, was, and is, the scarcity of water, even to drink. The placers lie about 700 feet above the head of the Arizava river, which winds its course six or seven leagues away to the north and east.

From the town of San Francisco, built right among the placers of Los Llanos, and due west some four leagues, was soon discovered the placera of La Cienega, grander in extent even than those of San Francisco.

Cienega proved a much more favored region from the fact that a great belt of limestone crossed the placers from southwest to northeast, and through which a subterranean water-course had cut its way, that required but tapping to come in abundance to the surface. At the southeastern edge of the placers the town of Cienega, with a beautiful oval reservoir in its center was soon built, the population reaching at one time 15,000.

However, in nearly all cases the placers were and are to-day worked by "dry-washing" processes, with bateas, haskets and blankets, and now mostly by dry-washing machines, the latter being something similar to the machines

used in many warehouses for cleaning grain.

The working of the sands at Los Llanos and Cienega was pursued industriously and successfully for many years, and is even the source of a considerable income to-day, to those who have capital enough to employ dry-washing machines. From the most authentic accounts and records kept in the State of Sonora, both official and private, the writer estimates that eighty millions of dollars have been taken from these two placers alone since their discovery.

On the writer's visit to these placers in 1872, and again in 1874, as one of the directors of an American company, formed in San Francisco for the complete exploiting and working of these gold-fields by American methods, I found the two little cities of San Francisco de Los Llanos and La Cienega a mass of almost undistinguishable ruins, with here and there a remnant of a once church tower or spire, with the walls of vast and commodious buildings at one time, crumbling to the ground; hardly a shelter left where we could camp with comfort or safety. Yet at this time there were under different managements, fully 50 of the dry-washing machines, spoken of above, with about 300 Mexicans and Yaqui Indians at work on different parts of the placers.

The dry washers were generally located on the higher ground, or on mounds made from previous workings, six men being allowed to each machine, one at the feed-hopper, two at the shaking and agitating oranks, one to manage, prospect and clean up, and two to carry up the dirt from the pits of caving, running sands, from a depth of about 15 feet. The coarser parts of the dirt are sifted by the machine from the finer, and run out over an upper shaking table, while the finer particles are dropped on a canvas apron, through which air is blown by a bellows below. A day's work of a machine from dark in the morning till dark in the evening, may be set down, at 30 tons, of 2000 lbs. with a result of about 20 cents per ton, unless in favorable ground, and the occasional finding of a "Chilepa." The wages of the Indians, is 60 cents per day each; they board themselves, the owners furnishing supplies, equal to one-half the wages at fully 75 per cent profit. The dry washers cost on the ground about \$70, and need but few repairs; the latter being easily accomplished by the use of what has not been ineptly termed, the iron and steel of Mexico—rawhide. In a future article I propose giving you the exploiting and experiences among these placers, assisted by the use of modern methods.

CHARLES MARION TYLER.

San Francisco, April 6, 1891.

A Peculiar Occurrence of Gold.

C. H. Aaron writes to the *Engineering and Mining Journal* as follows:

While in Honduras recently I found gold in what is to me a novel connection. I had heard of it before I saw it, and, whether unusual or not, it was a puzzle to prospectors and mining engineers alike.

The ore was a ferruginous quartz occurring in small veins near Concordia, in the Department of Olancha. When ground to pass a 40-mesh sieve and washed in a horn spoon, a white or yellow substance was found which was so little heavier than the iron oxide as to be separated from that only with difficulty and by a peculiar manipulation. No gold was seen, although the assay showed in some cases as much as four ounces per ton.

On grinding the substance in an agate mortar, gold became visible, and on treatment with nitric acid the white matter dissolved with effervescence, leaving yellow, flocculent matter and a considerable quantity of high-grade, clean gold.

These facts seemed to indicate calcium, strontium or barium as carbonate, but the nitric solution did not respond to tests for these nor for lead. I then felt almost sure that I had spathic iron to deal with, but on charcoal before the blowpipe the stuff melted, gave a yellow sublimate which was not that of zinc, and, on addition of sodium carbonate to the assay, I obtained a head of blismuth. The yellowish matter inclosing the gold was, therefore, blismuth carbonate stained by iron oxide.

I afterward dissolved a quantity of the substance precipitated by dilution, collected, and smelted out a good head of blismuth.

This reminds me of a characteristic reaction of blismuth which I have never seen mentioned outside of my own publications. If a head of pure blismuth is melted before the blowpipe on a cupel, and allowed to cool, it becomes covered by a film of brown oxide. This much everybody knows; but if the cooled head is examined it will be seen that the film of oxide is cracked across the top, and the bright metal is visible in the fracture.

In the case of blismuth, which I have smelted before the blowpipe from the native carbonate, the behavior was a little different; instead of the film being ruptured in the form of a crack, the head gave birth to a minute globe issuing from the side, to which the globe adhered, remaining lustrous, while the parent head was dull. These phenomena I have verified repeatedly, they are referable to the well-known expansion of blismuth at the moment of solidification after fusion.

CALIFORNIA COPPER.—There was shipped from here to New York last month 933,550 pounds of copper matte, 3900 pounds of ore and 72,000 pounds of cement copper.

The Molesworth Ore-Reduction Process.

About six months ago a new process for extracting gold from pyrites, or other refractory matrices, was invented by Mr. Francis Hylton Molesworth, of Adelaide, South Australia. Mr. Molesworth had previously filled the position of Lecturer on Analytical Chemistry at the School of Mines in Adelaide, and had for some time been carrying on experiments which resulted in what promises to become one of the most effective as well as cheapest processes yet discovered for nearly all kinds of refractory metallic ores. At first Mr. Molesworth directed his attention to the extraction of gold from pyrites, but as he continued his investigations and experiments, he found that the same process, with certain modifications was equally adapted to the extraction of other metals, as copper, zinc, antimony, etc. On the invention being introduced to the notice of a few practical business men, interested in mining pursuits, they agreed to form a syndicate to provide funds for erecting a large working model plant, and for securing patents for the invention in all the principal mining countries of the world. Several hundred pounds were expended in this way. The model plant was erected on the engineering works of Messrs. May Brothers, Gawler, and was found capable of treating about 30 hundredweight of pyrites per day. It was in operation at short intervals during several weeks, and the interest felt in it was shown by the numerous visitors, scientific, practical and speculative who went to see it at work. The directors of the New Alima and Victoria gold mine, where a considerable percentage of the gold is found in pyrites, were so satisfied with the success of the process that they entered into an arrangement with the Molesworth syndicate to erect on their mine a complete plant, capable of treating 100 tons of ore per week. Hitherto the process by which they separated the gold from the pyrites was almost entirely mechanical, but they found that the working model could do in three-quarters of an hour what their plan required 24 hours to accomplish. The plant was expected to have been at work nearly two months ago, but the strike at first caused some delay, and then a defective casting required to be reconstructed. Next, a little difficulty with the masons, and then the holidays have all helped to postpone the starting of the plant. It is only now waiting for the completion of a special chimney stack, which is very nearly finished, so that the opening is likely to take place very shortly.

The process consists in oxidizing the crushed ore or pyrites in a cylinder, which is kept slowly revolving in a furnace, where only a moderate degree of heat is required. The cylinder in the working model was five feet in length, one foot in diameter at one end, and nine inches at the other (approximately). Within the cylinder there were a number of small flanges for the purpose of carrying round the pulverized mineral, so that on reaching the top it would fall clear to the bottom; the use of this arrangement will be seen presently. The cylinder is placed at a slight incline to facilitate the passing of the ore from one end to the other. It is fed at the upper and larger end from a hopper which delivers the ore into a small pipe containing an archimedean screw, so as to keep up a regular stream of pulverized ore into the cylinder, the upper end of which is otherwise closed. In the center of the top of the furnace an iron retort is placed a few inches above the cylinder. The retort is charged with crude nitrate of soda moistened with acid, and a bent tube conveys the gas down into the lower open end of the revolving cylinder.

The gas is a compound of oxygen and nitrogen, containing an excess of the former, and its effect on the particles of heated ore as they fall from the top to the bottom of the cylinder is remarkable; from a dull red they immediately become at almost a white heat, and the sulphur in the ore is rapidly and effectually driven off. The effect can be seen by removing a brick in the end of the furnace opposite the open end of the cylinder. The action of the acid on the nitrate of soda produces not only the gas above mentioned, but also nitric and hydrochloric acid, as well as sulphuric from the sulphur contained in the pyrites. These by-products are derived from the gases generated, and which are collected in a chamber especially constructed for the purpose. The cylinder is not allowed to acquire a greater degree of heat than what is described as "dull red," and is made to revolve slowly, so that the ore occupies from 10 to 12 minutes in passing through it. At the lower end it falls out into a receptacle, and is found completely desulphurized, so that it is fit for immediate amalgamation. But Mr. Molesworth prefers treating it in a bath of aqua regia prepared from the acids before mentioned. The gold being thus dissolved, the liquor is filtered through charcoal, which retains the gold, and the charcoal being placed in a furnace, the gold is smelted and recovered. Mr. Molesworth claims that his process will save from 90 to 95 per cent of all the gold contained in pyrites, and estimates the cost of the operation at about 4s. per ton of crushed ore, this cost including interest on the value of the plant. The cost of a plant to treat 100 tons per week is estimated at between £300 and £400. Hitherto it has been difficult by most of the ordinary processes to save more than 60 per cent of the gold in pyrites, so that if Moles-

worth's patent will save 90 per cent, that will be 30 per cent more than the ordinary processes (putting the expensive one of chlorination out of the question). And not only is its advantage seen in saving 15 dwt. where only 10 dwt. were got before, but in the lower cost of the process, so that 1 dwt. of gold would cover the cost of saving 15 dwt., whereas 2 dwt., under old systems, would be required to recover 10 dwt. Among other advantages possessed by this process are: (1.) The saving in grinding the stone, as screens of 48 holes to the square inch are quite fine enough, the desulphurizing process effecting all that is necessary on that grade. (2.) In treating sulphide ores an excess of liquor is produced, and can be used for treating other stone containing "flour gold," which by this means can be readily saved. (3.) The entire removal of the sulphur is not necessary so long as the pyrites are decomposed. (4.) It is impossible for the ore to "slag," as it must come out perfectly oxidized.

In the course of the exhibitions given of the process, Mr. Molesworth treated very successfully auriferous antimony from the Mount Ophir mine in the Hillgrove district of New South Wales, leaving the gold free and bright. Sulphide copper ore, much mixed with iron, from the Mutuoro was also successfully operated upon, and zinc blende in combination with silver ore from Broken Hill. The treatment of the antimonial ores was especially admired, and all the experts who witnessed it were loud in their praise of the process. In the case of the copper ores, many pieces as large as hens' eggs were desulphurized in 12 minutes on passing through the cylinder, thus showing that it is only in the case of the precious metals that pulverization is necessary. Mr. G. W. Goyder, C. M. G., the Surveyor-General of South Australia, among other scientific gentlemen, witnessed the process, and expressed his pleasure and surprise at the wonderful effects produced by such apparently simple means. In common with others, he expressed the opinion that if the working of the Molesworth process on a large scale prove as effectual as when shown at Gawler, it will revolutionize gold mining in Australia, and make remunerative hundreds, perhaps thousands of claims, that cannot now be profitably worked. — *Australian Mining Standard.*

The New University.

Senator Stanford, in speaking to a reporter concerning the new University at Palo Alto, says:

"I have talked over the University matters with Prof. Jordan, and I expect him out here some time during April. In any event, he will be here by June. The University will be opened at least for the freshman class by October. Of course, in time, the University will be complete from the kindergarten to the post-graduate course, but that can only be after a village has grown up around the University."

"When the University opens there will be accommodation for about 700 pupils in the dormitories. My idea is not to build big dormitories, but to have 20 or 25 in each, thus making a sort of club."

"The technical department of the school I propose to have more complete. There is no use filling a lad with learning and then turning him out to earn his living when he does not know how. We will teach him, then, to use his hands. Any profession he chooses he can take up and learn there. By this course, I think we will turn out an improvement on the usual graduate from Eastern colleges."

"Young fellows—nice, bright and well-taught boys—come to me continually with letters from friends, asking for positions for them, and yet there is nothing they can do. They have to begin, then, right at the bottom and learn how to work."

"The girls will be accorded the same privileges as the boys, as far as their sex will permit."

"The University will not be free. It has been decided that better results can be gained otherwise." There will, however, be provision made for all sorts of free scholarships, and everything possible will be done to help poor boys to get an education. The institution is designed mainly to benefit middle-class people, though the sons and daughters of the rich will be as welcome as the others."

"I have not decided on any other professors as yet. In selecting the remainder of the faculty I will be guided to a great extent by Prof. Jordan, who knows them all. He is a Cornell man, and the Cornell course more nearly coincides with my ideas than that of any other of the colleges."

NEW IMMIGRATION LAWS.—The amendment made by the last Congress to the immigration law, and relative to the importation of aliens under contract or agreement to perform labor, was put into effect on April 1st. The amendment creates the office of Superintendent of Immigration, who is to be appointed by the President, with a salary of \$4000 per annum. The new law makes it an offense for any teamship or transportation company to invite or encourage the immigration of any alien through agents, either by writing or printing, or by oral solicitation, except by ordinary commercial letters or advertisements, merely giving the sailing date of vessels and terms and facilities of transportation. The amendment makes it an offense to encourage any alien to migrate to this

country on the strength of any printed advertisements or circulars holding out offers of employment. All aliens coming on such representations will be treated as contract laborers. This does not apply to State Immigration Bureau's offers.

Mica in Australia.

The *Australian Mining Standard* says: Although the mica discoveries in the northern portion of South Australia have been mentioned in previous issues, the subject is of sufficient importance for further notice. Since the previous references, additional information shows more clearly than before the value of this mineral. It seems highly probable that the mica mines will become a source of national wealth, the size and quality of the deposits at the MacDonnell Ranges being exceptional. Every one who has viewed the sheets of mica lately brought down to Adelaide by the discoverer, Mr. Benstead, is unanimous in praising their extraordinary size and quality. Within the last eight or ten years the demand for mica has largely increased, and the price has risen fully 200 per cent. The uses to which mica is applied have also increased in proportion, and a large demand for the article for electrical purposes has sprung up. The large sheets are especially adapted for the armatures of dynamos and condensers for electric lighting, for which purpose, being a non-conductor, it is well adapted and so commands a high price. We have quite recently heard from a professional expert that it is used in the Bank of England as a practically indestructible medium on which to write, with a sharp-pointed style, important records. The writing, which is scratched into the substance of the mica, is afterward smoked over the flame of a candle, and the smoked surface being rubbed clean, the writing alone remains the black. The same expert, Mr. Heinrich Keuper, states that he has traveled through the great mica mining districts of Russia, but nowhere has he seen any samples to equal the material which he was shown in Adelaide. It may be allowable to repeat the dimensions of the sheets exhibited. The smallest pieces were 3x4 inches, and others of various sizes beyond, some being 8x10, 8x12, 10x14, 12x14, and 18x24 inches. The following quotations are copied from a recent price list received from America: 1½x2 inches, 40 cents per pound; 2x4½ inches, \$1.10 per pound; 2½x7½ inches, \$3 per pound; 3x6 inches, \$7.50 per pound; 8x9 inches, \$9.75 per pound; and larger sizes, \$10 and over. The mica from the northern mines can be obtained six times the largest size given in the above list, so that it should fetch a proportionately higher price. These quotations, high as they are, have received confirmation from an independent source, a letter having been received from London by one of the partners of a large commercial house in Adelaide, the writer of which mentions an interview he had with a dealer in London who offered him 32s. per pound for moderately large sheets, but said if he could bring him a sheet 18x24 inches he could give him £20 for it. One sheet measuring 40x44 inches was got out at the mine, but being thought too large for carriage was cut in two. Further discoveries in the same district have been reported, and great interest is felt in the development of this important industry. Mr. Dyke is expected to arrive in Adelaide shortly with over a ton of good mica. The vast importance of these discoveries from a commercial point of view can hardly be overstated. We have here indicated a few of the uses to which mica can be put. These do not represent one-half its utility. It is such discoveries which stamp Australia as one of the most remarkable mining countries on the face of the globe, and prove that its resources are illimitable. South Australia is to be congratulated that its vast northern regions, though denied rain and pasture, have been supplied by bountiful Nature with products which will contribute greatly to the national wealth.

THE GRIPPE IN NEVADA.—W. S. Morgan, a mining man from Carson, Nev., who is stopping at the Commercial hotel, is authority for the statement that the men employed at the Holmes mine at Candelaria, Nev., have suffered terribly from the ravages of the grippé. "Out of 600 men employed in and about the mine," said Mr. Morgan yesterday, "more than 400 have been prostrated and something more than 100 have died. The disease raged for a time with such violence that work in the mine had to be practically abandoned and the company's physician was himself prostrated from overwork. There has been an abatement of the disease within the last few days, I understand, but a great many of the men are still unable to work. This is probably the worst case on record, and proportionately knocks the death-rate in Chicago from the same cause into a cooked-hat."

CONTRACTS have been let for the construction of 14 miles of the track of the San Francisco and San Mateo railway, an electric road to run from this city to the Baden stockyards. California material will be used exclusively. The rails are being turned out as rapidly as possible at the Pacific Rolling Mills, and it is proposed to spare no expense in the construction of the line.

JOHN KELLY, superintendent of the Bodie Cons. Mine, was shot by James Grant at Bodie last week. The wounds are serious but not dangerous.

Mining in Lower California.

Consul Viesoa of La Paz, writing to the State Department, describes the condition of Lower California as very backward. He says, although the republic of Mexico has enjoyed of late years an uninterrupted period of peace and prosperity, it is a noticeable fact that this peninsula has not been in the ranks with other parts of the country in its development and advancement during this epoch. Much no doubt is due to its topographical situation and to the great want of facilities for periodical communication with other parts, for as yet there are no telegraphs or cables existing, and it has happened at times that an entire month has elapsed without receiving news from the balance of the world.

Under such trying circumstances it is difficult for any country to make any progress. It is quite true that its agricultural resources are very limited, but there are other elements, such as mines, pearl fisheries, dyes of various kinds, etc., which offer inducements to enterprising people. The present settlers are, as a rule, little inclined to mining ventures, and, in fact, but few are acquainted with mining, which will undoubtedly later on constitute the wealth of this country. As it is, in this immense territory of 8709 square leagues there are but 21,000 inhabitants, of which perhaps about 1000 are foreigners.

It is gratifying to note, nevertheless, that what few industries exist are in a prosperous state. The following is a statement of the mines now in operation: The Bileo Company, situated at Santa Rosalia, about 200 miles from this port and about opposite the port of Guaymas, is controlled by parties in France. It has an immense plant of machinery for smelting great quantities of copper ore daily, and the group of mines which furnish the ores seem to be very extensive, and are connected with the works by railroad.

For a long time after the commencement of operations by this company it met with severe reverses and heavy losses caused by fires and floods principally, and partly through mismanagement, but withal, the mines proved themselves good, and the concern is now in a prosperous state. The company employs from 1000 to 1500 men constantly, and a town of considerable importance has suddenly sprung up in the vicinity. The shipping at this place has now become very important, and during the last fiscal year it appeared in the Government statistics of customs as the third port in the republic.

The fact is attributed in a great measure to the circumstance that every necessary article for the maintenance of the place, such as fuel, beef, produce of all kinds, materials for building, as well as all kinds of goods, have to be imported, as the country in that vicinity does not produce anything whatever. The landing place is an open roadstead, and at times it is dangerous to vessels lying at anchor. During September last two foreign ships were driven ashore in a squall and lost.

The Angeles Bay Gold and Silver Mining Company is also in a prosperous condition, and although now working on a small scale it is capable of being extended. The San Antonio mining district, in the southern part of the peninsula, is the location of the Progreso Mining Company, which is without doubt the most important in the territory. This company has in operation one of the most complete and perfect plants of machinery in the country, and its silver mines are in splendid condition. The ores are not, as a rule, of very high grade, but this is compensated for by the abundance of the yield. This company is in a flourishing state, and with the large force of men in its employment, it is a source of maintenance for the most part, of this district.

The San Antonio district is worthy of mention as a great silver mining country having a number of mines which might be worked to advantage. The Mexican Mining Company, a newly-formed company, is now working and prospecting some of these mines preparatory to introducing machinery. The results met with lately are very encouraging, and it is to be hoped that after all these facts become better known to the public, immigration and capital will be finally induced to this district. The shipments of bullion and ore from the above district to the United States during the last year were valued at \$606,280 in gold, while the imports of machinery, lumber and provisions from the same source amounted to \$133,108 41.

RAILROAD CROSSINGS.—In confirming the judgment of the lower court in New Jersey, in the case of a killing on a railroad crossing, the U. S. Supreme Court says: "While those using public highway are under the duty to keep out of the way of railroad cars crossing it, and to exercise such care as circumstances make necessary, the railroad company in moving cars upon its road is bound to exercise like care toward those who are obliged to pass over its tracks. The right of a railroad company to the use of its tracks for the movement of engines and cars is no greater in the eye of the law than the right of an individual to travel over the highway extending across such tracks."

The Southern Pacific Company will soon equip 20,000 freight cars with automatic couplings, to replace the old style of iron drawheads, with link and pin attachments.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

BELMONT.—*Ledger*, April 4: The superintendent reports the surface tunnel has been advanced 20 feet the last week, the face of the tunnel now being in solid ore highly sulphureted. The 10-stamp mill is running full time, and the yield in amalgam from the sluice plate is excellent.

PIONEER.—Mrs. Langhorst and Geo. Weller have sold their stock in the Pioneer M. Co., consisting of 46 shares. W. F. Detert was the purchaser, as the agent of other parties. It is expected, also, that Mrs. Walther's stock, consisting of about 20 shares, will change hands shortly. There are 320 shares in the company.

PIONEER CREEK.—Cor. Amador *Dispatch*, April 4: Pioneer Creek is getting to be quite an enterprising place once more as several quartz mines have started up lately and all seem to be producing ore at a lively rate. The most prominent among them is the Gracy mine. Some months ago, Mr. Gracy started a tunnel to be 500 feet in length to tap the Sunny South mine, some 40 or 50 feet deeper than the old works. When he had run in about 300 feet he struck a well-defined 3-foot ledge that prospects from \$50 to \$60 per ton. This has every indication of being a permanent and well-defined ledge, as he has sunk a shaft to water level, some 50 feet below the tunnel, and as evidence of its holding out he has about 300 tons of that valuable ore on the dump. The Griesbach Yelmini mine is about 6 or 8 feet in width and of low-grade ore, but there is no doubt, as they drive their tunnel ahead they will strike a richer rock, as this mine heretofore has produced ore of a pretty high grade. They have a new ten-stamp mill at the mouth of their tunnel and everything is in ship shape for work. The Bowman mine has out about 100 tons of \$20 or \$25 ore; the mine looks well but for some reason they are not working at present. We understand they are going to start up as soon as they can get their ore milled so as to make room for more ore. Mr. Kimball has also struck a ledge of about \$20 per ton ore, and has a shaft down about 60 feet deep and levels run 40 or 50 feet each way, the ledge being small. No one was surprised at Mr. K.'s striking a ledge as he has a mineral rod and consequently can find a ledge any time he chooses. Jack Porter has struck the extension of the Griesbach Yelmini mine; it prospects very well for top rock and we have no doubt but it will develop into a good paying mine.

Butte.

LARGE NUGGETS.—*Chico Chronicle-Record*, April 4: Yesterday a reporter of the *Chronicle-Record* learned that several valuable gold nuggets had been found on Rancho Chico by a hunter. Some time in the latter part of February a man by the name of McCabe, who resides near the residence of Mr. Meyhem in Chico Vecino, went hunting in Iron Canyon. Becoming wearied he sat down to rest and refresh himself on a side-hill. With his boot heel he uncovered a good-sized nugget of gold. Being unacquainted with the metal he was somewhat in doubt as to what it was, but its weight excited his suspicion. With a stick he probed the earth and succeeded in bringing to sight another, several times larger than the first. With the crude means at hand he could not uncover much ground, but several small colors were secured after the nuggets were picked up. He kept the secret some time until one day he made a confidant of Mr. Meyhem, as he recognized in him a man who would be likely to know the value of his nuggets, if they were gold. Mr. Meyhem took the nuggets to the Bank of Chico where he found that the largest one weighed 4 ozs. and 14 pennyweights. The place where the gold was found was then visited and when the men returned Mr. Meyhem interviewed Gen. Bidwell as to what arrangements could be made to develop the claim, as the property where it was situated belonged to him. After making a satisfactory agreement another visit was made to the place, this time in company with the General. We understand that Gen. Bidwell has agreed to work the claim and allow Mr. Meyhem and Mr. McCabe a certain part of the profits, if there are any. He reserves the right to stop at any time if he finds that the working of the mine affects Big Chico creek, near which the claim is situated. Col. C. C. Royce, business manager of Rancho Chico, who was one of the party to visit the spot, was seen last night. He expressed an opinion that the nuggets found were probably all that there was, and that there might be nothing left. To him the prospect of a big mine is not very promising, but nevertheless, of course, it is impossible to state for a certainty. The nuggets were shown us last evening and they were indeed beauties.

Nevada.

BRUNSWICK CON. MINE.—*Grass Valley Union*, April 4: Supt. Fitzgerald's last letter to the home office at New York says of the Brunswick mine: Continued improvement during the week has taken place in east drift, and a decided and very good improvement in the ledge, which has widened in size to 3½ feet and looks as if it would fill the whole drift. The ore is about the same kind as before, not so much sulphureted, but it is the same ribbon rock. If it holds out it is a fine milling proposition. It looks more like a mine than ever. I did not expect to find such a width of quartz so near the shaft. Shares to the number of 7500 were dealt in at the New York Mining Stock Board last week at prices ranging from 9 to 12½¢ per share.

WORKING BLACK SAND.—*Grass Valley Union*, April 3: Arrangements are being made for the shipment of a considerable quantity of black sand from the gravel mines at Dutch Flat to the new Extraction works at Grass Valley, which are now ready for business. This sand contains gold that could not be extracted by the ordinary sluice-working processes.

NORTH BANNER MINE.—*Grass Valley Union*, April 5: A station is being cut out for the 400 level of the North Banner mine. The lode in the mine is showing strong and is of high grade. Besides the footwall ledge, which is 3½ feet in width, there is another ledge coming in from above, also carrying good ore. The vein is making strong to the north of the shaft, and is also coming in good size to the south of the shaft, where heretofore it has been

small. The mine is now able to furnish more quartz than can be reduced by the company's 10-stamp mill. For the coming month the product of the mine promises to be larger than on any preceding month since operations have been carried on, and the continuance of monthly dividends may be expected.

MINING ELECTION.—The annual election of the stockholders of the North Banner Con. Tunnel Co. was held yesterday, at which the reports of the officers were received and accepted, after which an election was held of five directors to serve for the ensuing year. The following were chosen: George Fletcher, John F. Kidder, E. H. Brown, A. Materson and W. E. Brown of San Francisco. The Board organized by electing George Fletcher president and manager; John F. Kidder, vice-president; E. H. Brown, treasurer and Thos. J. Michell, secretary. The Board voted to pay a dividend of five cents per share, amounting to \$5000, on the 20th of the present month.

NORTH STAR DIVIDEND.—The North Star M. Co. has declared a dividend (No. 6) of 50 cents per share, payable on the 8th inst. This dividend will amount to \$50,000, making \$300,000 in all declared by the present company. There are other dividends in sight in the mine.

OMAHA MINE.—Friday was regular monthly payday at the Omaha mine. There are 150 men on the regular payroll, besides tributaries and contract men. The mine is looking well throughout and is producing largely.

MORE RICH GRAVEL.—*Transcript*, April 1: At the Harmony yesterday there was found in the north drift, at a distance of about 800 feet from the incline, gravel that pays on the bedrock \$5 a pan according to some of the workmen, but which is said by Foreman Helm, who is an extremely conservative man, to go "as high as \$2.50." From the present face of the tunnel to the old workings it is a distance of 175 feet north, and the bedrock is pitching in that direction. At a distance of about 650 feet north from the bottom of the incline, east and west drifts were run and made good developments. The main tunnel upon being extended from that point encountered a raise in the bedrock which led the management to recently raise up ten feet and continue ahead on top of it.

THE STEEP HOLLOW MINE.—*Transcript*, April 6: The company recently organized in S. F. to work the Steep Hollow quartz mine is building a stretch of road for a distance of nearly a mile to give better access to the property than is afforded by the old road which is frequently obstructed with snow in the winter. When this is completed and a boarding house is built sinking on the two pay shoots heretofore discovered will be begun.

THE GOLD BANK.—The G. V. Ry. & T. Co. are surveying from the mouth of their tunnel to the Oro Fino mine to obtain altitudes and depths and to get the "lay" of the shoots around the Oro Fino. When this is completed a test will be made of the gravel found in the drain tunnel and the driving of the main tunnel will be resumed.

HAVE FOUND THE LEDGE.—At Gooseberry Ravine this side of French Corral some boys recently found specimens of float quartz containing gold to the value of \$6, \$18, \$23 and \$32 respectively. Since then a party of men have been prospecting there and on Friday last they discovered a promising looking ledge which they will at once proceed to develop.

Placer.

NORTH FORK.—Cor. Greenwich *Bulletin*, April 1: The Dutch Hill mine is working a full crew of men. The company will soon begin running a new tunnel to tap the channel higher up. The Glazier Co. is still pushing ahead and taking out pay. The Sunnyside Co. continues prospecting with the view of tapping the main channel. Bressler & Davis will resume work on the Malvern Hill mine. Angus Cameron has completed his mine tank and is ready to begin washing gravel. H. Kelley is running a tunnel on Meaker Flat and taking out good pay. Sam Olsen is also taking out good pay above Bamboo Bar. Duryea & Savercoz are doing well at the Kirkham claim. B. Plazoni is running his tunnel. It is reported that his mine will be sold this spring to parties below. The "Nip and Tuck" mine is being worked by Pollard & Bamrick. Good pay is reported. Wm. Long, of Susanville, reports good pay in the tunnel of the Cariboo mine. Gardner & Trucks are working their mine at Cariboo successfully. Jeff. Buffington is working in his tunnel with good results. Several claims will be worked as soon as the water will permit. The outlook on the North Fork this season is good.

Plumas.

M. NOTES.—*National*, April 14: One day last week, the Pine Leaf Co., made some developments which promise to be something good. The company commenced prospecting some four years ago. After an unsuccessful attempt to reach bedrock with a shaft, a tunnel was run to tap the channel. The shaft was sunk to the depth of 89 feet, when the water became unmanageable, forcing them to abandon it. The company then devoted their time and energy in driving a tunnel, and after a couple of years hard work, succeeded in reaching the channel. The tunnel was run a distance of some 800 feet through hard bedrock, which made it slow and tedious, but the boys stayed with it, and it is hoped will be handsomely rewarded for their undertaking. The Tunnel is some 10 feet in bedrock. A raise was made in order to strike the shaft, when 2½ feet of fine gravel was struck, which prospected very big with the pan. On making the excavation for timbering the shaft, 5½ car-loads of gravel were taken out, netting \$2.12½ to the car. The indications are at present writing, that a fine body of gravel is ahead of them and there is no doubt that a good mine has been struck. The mine is situated at the head of Pine Leaf, two miles north of Spanish Ranch. The ravines and gulches paid big in early days, which is a favorable indication for a good channel. This locality bids fair to be the drifting center for Spanish Ranch and vicinity, as there are no less than seven companies pushing their tunnels in with all possible haste, hoping by spring to strike the channel. East of the Pine Leaf Co., are the Challens mine, the Iota mining Co., Murdock Bros. & Erickson, who are developing some three miles or more of the Challens channel. The Challens Co., have their tunnel in about 140 feet. They are working two shifts and pushing the work as rapidly as possible. The rock does not work to a good advantage, and does not blast well. The

Iota mining Co., have their tunnel in 150 feet and are driving it at the rate of 20 feet a week. They have good working rock, and hope to strike the channel by the first of April. The Murdock Bros. & Erickson are taking out gravel, which pays handsomely. On the west, Mat Kniewel is working away on the Summit channel and hopes, before long, to show the world good paying gravel. He is working on the north side of the ridge, tapping the channel by a tunnel. Abe Bolvar is bringing up his main tunnel and hopes by the first of March to be able to again take out pay dirt. Taking it all into consideration, there is no doubt, that by next summer, valuable developments will be made, and mining again receive a new life. As hydraulic is a thing of the past, the inhabitants are turning their attention to drifting, but as the channels are deep and long bedrock tunnels have to be run, it will take some time before anything permanent can be developed.

Sierra.

SUFFOLK TUNNEL.—*Mountain Messenger*, April 6: Rich pay gravel was found in the Suffolk tunnel at Wahoo, about the middle of last February, by David Moore, who is managing the property. This pay gravel was found near the line between the Suffolk and Golden Era, the latter claim lying north-east of the Suffolk, thus showing a continuation of the Western Union channel up the ridge toward Howland Flat, crossing on the way Golden Era, Pacific, Excelsior, California and other claims up the ridge. For this information we are indebted to Phil Doray, who is a large owner in the Era and Pacific. All the ground above the Suffolk can probably be worked through the tunnel; and if it should be that it could not, a short tunnel not over 2000 feet long can be easily put into the Golden Era ground.

EXTENSION.—Jeff Lawrence was here Thursday on a flying trip from Forest City and reported that the boys at the new Extension tunnel could see gold all through the gravel near the top of the prospect shaft, and small specimens had been picked up close to the bedrock. A working shaft, 100 feet ahead of the prospect shaft, is being raised to gravel, that may not be very far above the tunnel, as the red slate at the face, last Saturday, was so soft that breasting boards had to be used to protect the miners.

THE TELEGRAPH Co. has found good gravel in their claim at Fir Cap. How extensive the find is cannot yet be told, but there is a good chance for a very extensive drift gravel mine. Amos Hart and John Hainer are running a prospect tunnel below the old Badger Hill claims, on the South Fork. John Tournay has taken the interest of Frank Stewart in the claim which the latter was prospecting at the time of his death.

Siskiyou.

STARTED UP.—*Yreka Journal*, April 1: The mill at the Boyle mine on Humburg was started up about a week ago, with a large supply of quartz on hand, and a full force is at work getting out more. During most of last week, considerable snow fell on the summit of the Humburg range, making the old and new snow together, some four feet in depth, but affords good sleighing for hauling the quartz to the mill on sleds.

BLUE GRAVEL.—Lee, Lash & Co. still continue to realize good pay from the blue lead at Greenhorn, besides devoting much attention to ascertaining the course of the old channel and its extent. Louis Guilbert and Uley Brown who are now sinking a shaft in the Kildore hills, three miles south of Yreka, have struck blue gravel, and will continue sinking down until bed rock is reached, to ascertain how thick the strata is, and what it pays. Considerable stock has been taken in the Yreka Blue Gravel M. Co., and machinery will be secured as soon as possible for boring down to bed rock to discover at what depth blue gravel may be found in the vicinity of the Oberlin wagon road, where it crosses the divide from Yreka creek below the mouth of Greenhorn. M. McIntyre has lately discovered a very rich quartz ledge on Sucker creek, a tributary of Humburg creek, the quartz taken out showing considerable gold to the naked eye. It is believed to be a permanent ledge and of large size, at least such are the indications at the croppings. The quartz mill lately on Yreka Flats, is now being put up in the Long Gulch section, where Blessing & Co. and several other companies have a large quantity of quartz on hand to crush, and intend getting out more. There are several ledges on that gulch, and also at Loafer Hill, where Yreka Flats reaches Long Gulch. When the country south of Yreka is opened up extensively in developing blue gravel channels or leads, we may anticipate finding plenty of water that can be easily raised to the surface by pumps, for mining and irrigating purposes, with possibility of securing artesian wells in boring deep enough, to force the water up naturally. The miners in several sections of this county are unable to find any section corners for surveying their claims, as a large extent of the country mapped out has only been surveyed on paper. The Kildore Hills, south of town, and the country adjacent, is placarded with notices of claims taken up, since the discovery of rich blue gravel on bed rock at various places. The country, south of Yreka, on west side of Yreka creek, has never been considered as valuable for mining, but from present indications may turn out to be the richest mining section in Siskiyou. The gulches in the vicinity paid well in early days, but no one thought that rich gravel beds existed beneath the sand stone quarries and cement found at various points, on a line running directly through this section along the old Oregon wagon road to Siskiyou mountain via Butcher Hill and Willow Creek.

Tuolumne.

RICH STRIKE.—*Independent*, March 21: Great excitement prevailed last Tuesday in the neighborhood of Sugar Pine on account of a rich strike in Bernard Pacholke's mine, about three-quarters of a mile from the Green mine. Everyone for miles around came to view the golden discovery. Forty feet of the two-foot vein, carrying free gold the entire length, has been exposed. In almost every foot of the exposed vein gold is visible to the naked eye. From the rich nature of the surrounding country, and the unusual richness in sight, the Pacholke mine will undoubtedly prove to be a valuable one. We received a specimen of the ore, which is in free gold perceptible to the eye. The late strike is in the vicinity of the Green mine, also the Confidence and Excelsior, which properties have yielded millions of dollars, and from present indications more of the golden treasure will soon be extracted. The Green

mine has been incorporated and sold in shares in San Francisco, many shares having already been disposed of. An extension of the Green mine, owned and operated by J. T. Ryan, has a flattering prospect of future promise and prosperity.

STRIKE.—*Sonora Democrat*, April 4: A rich strike is reported to have been made in the Pirate mine, situated half a mile from the Excelsior hotel, at Sugar Pine. The mine is being worked by Bernard Pacholke and Frank Jasper. The richness of the ore has not yet been determined, but if Messrs. Pacholke & Jasper have any considerable quantity of ore similar to the specimen piece sent this office, Tuolumne may have a railroad yet. The Alameda mine, stated in last week's issue as the Chaparral, is not owned by a San Francisco party, but by M. B. Harriman, who has bonded it for 90 days to Irwin C. Stump, of San Francisco.

NEVADA

Washoe District.

CON. CAL. & VA.—*Virginia Chronicle*, April 4: There has been extracted from all parts of the mine 1540 tons of ore, which was shipped to the Eureka mill. Bullion shipped to the Carson mint, assay value about \$90,629.96. Bullion now on hand in our assay office, assay value, \$52,000.

OPHIR.—The west crosscut started from near the end of the drift run north from the drift run west from the winze, 122 feet below the sill floor of the 1300 level, has been extended 13 feet; total length, 25 feet, in a quartz formation showing low assay value.

UNION CON.—East crosscut No. 2 on the 1465 level, started from the north lateral drift at a point 200 feet south from the south boundary line of the mine, has been extended 23 feet; total length, 770 feet, continuing in a hard porphyry formation.

MEXICAN.—The east crosscut No. 1, started from the main north lateral drift at a point opposite the west crosscut No. 1, has been extended 19 feet; total length, 608 feet, in a softer porphyry formation.

YELLOW JACKET.—Shipping to the Vivian mill 38 tons of \$18 ore as per battery assays per day. Will commence to-day to ship about 90 tons of gold-bearing white rock daily to the Santiago mill.

CON. IMPERIAL.—We are still following up and taking out small streaks of ore from the upper levels and overhauling the old stopes.

CHALLENGE AND CONFIDENCE.—The joint Confidence and Challenge west crosscut from the north drift on the 300 level is out 46 feet, having been advanced to feet this week. The face shows quartz having no value.

SEG. BELCHER.—On the 600 level the east crosscut from the south lateral drift has been advanced 15 feet since last report, and is now out a total of 208 feet. The face is in porphyry and seams of clay. A portion of the week has been occupied in timbering the drift.

KENTUCK CON.—Raised one set in the east crosscut from the north drift, 1000 level; the top shows some bunches of ore, which were saved for pay. Started an east crosscut from the north lateral drift from the west raise, 1000 level, and advanced it 15 feet during the week; face in quartz of low-grade.

JUSTICE.—The north drift on the 822 level was advanced 19 feet since last report and is now out a total distance of 487 feet. The face is in a mixture of quartz and porphyry, which gives assays.

BELCHER.—No. 3 west crosscut, 300 level has been advanced 32 feet since last report; total distance, 249 feet. The face is in porphyry, clay and low-grade quartz. The east crosscut on the 1500 level is out 23 feet; the face is in porphyry.

ANDES.—The east crosscut from the south lateral drift on the 400 level has been advanced 18 feet; face in a formation of vein porphyry and clay. Easing timbers in main north drift, 420 level.

OCCIDENTAL.—The stopes on the 400 level are yielding some fair-grade ore. The south drift from No. 3 upraise, 40 feet below the 450 level, has been connected with the Nelson upraise; total length, 107 feet. The drift has been in fair-grade ore the entire distance, and is now in condition for stoping.

CROWN POINT.—The south drift on the 300 level is out a total distance of 75 feet having been advanced 25 feet during the week. The face is in clay and quartz with small bunches of ore. The 500 level west crosscut was advanced 18 feet since last report, making a total distance of 200 feet. The face is in clay and quartz.

SAVAGE.—We have hoisted 735 cars of ore from the 500, 750, 800 and 900 levels and from the intermediate below the 1300 level. Shipped to the Mexican mill 543½ tons and milled 550 tons; average battery \$15.42. We have bulled on hand and at the mill amounting to \$23,000.

HALE AND NORCROSS.—On the 1100 level of Norcross the north prospecting drift from the east crosscut has reached the north boundary, and is now being advanced in the Savage ground at the expense of the latter. On the 1400 level No. 4 west crosscut, near our north boundary was advanced 25 feet; total, 140 feet; face in low-grade quartz and porphyry.

SIERRA NEVADA.—West crosscut No. 1 on the 630 level from the northwest drift, 579 from the shaft, was advanced 40 feet; total distance, 265 feet. **UTAH.**—On the 725 level in the main west drift, at a point 140 feet from the shaft, a south drift has been extended 58 feet; total length, 114 feet, in a quartz formation varying from two to four feet in width, showing some value by assay.

POTOSI.—On the 930 level the east crosscut from the winze is out 240 feet; face in quartz, clay and porphyry. The winze is down 163 feet below the 1300 level; face in porphyry with streaks of quartz. The east crosscut from winze, 1300 level, is out from footwall 202 feet; face in porphyry and streaks of quartz.

CHOLLAR.—The south drift 1400 level was advanced 20 feet; total distance south of north line 30 feet; formation porphyry streaked with quartz. Joint east crosscut on the north line, 1400 level, is in 25 feet; face in porphyry. Milled the past week 519 tons of ore, worth \$20.49 per ton, as per battery samples.

EXCHEQUER.—East crosscut on the north line, 600 level, is out 161 feet; face in porphyry.

ALPHA.—The winze 80 feet north of shaft, 500 level, is down 73 feet; the bottom is in low-grade quartz. The north drift from the east crosscut, 180 feet east of shaft, 600 level, is out 69 feet, and connected with east crosscut 125 feet south of north line.

BEST & BELCHER.—Northeast drift from east

crosscut No. 1 has been extended 18 feet; total, 34 feet; face in hard porphyry.

GOULD & CURRY.—200 level: Have extracted from old stopes during the week the usual amount of ore.

Tuscarora District.

NAVAJO.—*Times-Review*, April 4: The 350 stopes are without material change, and are producing some very fine ore.

NEVADA QUEEN.—East crosscut from north drift on 650-foot level, has been advanced 30 feet in hard porphyry. Have started work in stopes above 550-foot level.

COMMONWEALTH.—Fourth level—West crosscut advanced 34 feet, still in porphyry. East crosscut extended 28 feet, water continues very strong. North drift from east crosscut extended 25 feet in the vein. South drift from same point advanced 30 feet.

BELLE ISLE.—The rich ore cut last week in the intermediate crosscut from No. 1 upraise, 350-foot level, continues. Drifts have been started each way on it, progress for the week 13 feet. Upraise to the east from the stopes, extended 4 feet and suspended. No. 2 chute is being extended so as to open up at that point the ore cut by the intermediate crosscut. The carload of ore sent to Selby's, sampled \$783 65 per ton.

NORTH BELLE ISLE.—North drift from Belle Isle 450-foot level extended 23 feet, the prospect continues encouraging. An upraise has been started 20 feet from the face, from which some high-grade ore has been taken, progress 11 feet. Sixteen cars of first class and 105 cars of second class ore have been taken from the 500 stopes. North intermediate drift from No. 4 chute, 600-foot level, has been extended 13 feet; the face is showing some very fine ore.

NORTH COMMONWEALTH.—First level—Has produced 20 cars first class ore average assay \$300 per ton, and 55 cars second class ore, assay from car sample \$18 per ton. Second level—North drift from west crosscut advanced 17 feet in low-grade ore, assaying from \$10 to \$35 per ton.

Pahrnagat District.

BONDED.—*Pioche Record*, April 2: S. T. Godbe, who has bonded three claims in Pahrnagat district, expects to begin development work on them some time next month.

Jackrabbit District.

DAY.—*Pioche Record*, April 2: The new air compressor at the Day mine is completed and was to have started yesterday afternoon to operate machine drills in the "December" strike. Air pipe is also being laid in the new tunnel and it is expected machine drills will be operating there in a few days more.

Pioche District.

Messrs. S. T. Godbe, A. Werner and William Lloyd, who own the Lincoln claim in the vicinity of the old Alps east of town, believe with others in the existence of a big vein in that locality and have just let a contract to sink the shaft 100 feet deeper. The indications are said to be good.

NEW FURNACES.—Telegraphic instructions were received last Saturday from New York by Supt. Godbe to at once begin the preliminary work necessary to the erection of two stacks at the new furnace site north of town. The first thing done will be the extension of the tramway to the new site, the laying of water pipes from town and grading. President W. S. Godbe of the company is expected from New York in about ten days with full plans and specifications for the new works, when we shall know exactly the program to be followed. Yesterday graders were put at work preparing for stacks and blacksmith shop, and a straight road, to be used for wagons and water pipes, is being cleared and graded from about the corner of Masonic cemetery to the new ground.

CLAFIN is the name given the new townsite, and like the name our town bears, it was first suggested by a lady, and is appropriate considering the fact that Mr. Clafin is the heaviest backer of the new enterprise, the successful operation of which means business prosperity for us and this section of country, better and more substantial than any we have enjoyed since what we are pleased to call "early days." This action of the mining companies in building is regarded as conclusive of the proposition of resuming work on the railroad, and that we have nothing to expect from that enterprise for an indefinite time.

ARIZONA.

RANDOLPH.—*Tombstone Prospector*, April 1: The Randolph mine changed hands to-day and will start up again under the management of Bausfield and Warner. The former was appointed agent of the company a short time ago and it is said the company will work it themselves. The work on the Mamie dumps is progressing with good results. The concentrates of the screenings with buddies is proving both economical and profitable. Dick Trezona and parties are chloriding the Bonanza near Last Chance and they are not dissatisfied. A whim is being erected on the claim being worked by Gage and Banning in the same quarter of the district. The lessees of the Junietta have been getting down to business with good prospects until yesterday when they had a falling out and work will not be resumed until Justice Alvord decides to-morrow for them who is right.

JEROME.—*Arizona Journal-Miner*, April 1: About 80 men are now employed at Jerome. Twenty men are also engaged in repairing the road and when completed freighting will be commenced again and the furnaces started up. Twenty men are also engaged in grading a sight for a new road. Six eight-horse teams are now engaged in hauling wood for the road and for the reverberatory furnace. Work will be carried on at this great copper camp during the coming summer on a larger scale than ever before, and within a short time it is expected that 200 men will be employed.

CATOCIN.—Supt. J. G. Marx, of the Catocin mine, has 12 men engaged in the development of that property. He says that the ore body is constantly increasing in width as depth is made. It is the intention of the owners to prospect it as thoroughly and as rapidly as possible, and should it hold out as at present, it will not be very long until they will erect a fine mill on the property to work the second-class ore. A carload of high-grade ore was received last night from the mine for shipment to a smelter for reduction, and another carload is already on the dump ready for shipment.

BRITISH COLUMBIA.

STRIKING OUT FOR THE HALL CREEK PLACERS. *Nelson Miner*, April 4: Long before the first day of June, the close of the lay-over season for alluvial claims, the owners of ground on Hall creek will have commenced operations. The representatives of 12 claims start for the creek next week. While they expect to find considerable snow on the ground, they go prepared to erect cabins and do other preparatory work that can be done as easily now as later in the spring.

CROSS-CUTTING THE SILVER KING ORE BODY.—The Silver King mine was visited this week by a number of local "experts," every one of whom say it is a wonderful property.

One "expert" in particular, whose mining experience was obtained while locating the Texas Steer, is enthusiastic at what he saw. He says the tunnel strikes the crosscut at right angles and within 3 feet of its west end, which goes to prove that the ore body is the full width of the crosscut—45 feet. The distance from where the ore body was first struck to the face of the tunnel is over 100 feet, with the face still in solid ore.

WORK CARRIED ON WITHOUT A MISHAP.—The working shaft on the Skyline, the Silver King of Hot Springs district, is down 190 feet, and a pump and station is now being put in, as water has been troublesome for some time. The shaft will be sunk another 100 feet.

A NICKEL CLAIM BONDED.—Whether or not the nickel claims in the vicinity of Nelson are workable propositions remains an open question. That the ore contains nickel is well known, and it is equally well known that the ground is favorably situated for working. One of the best known of these claims is the Maud A., owned by E. R. Atherton. This week a coast capitalist secured a working bond on it, and by its conditions he will be required to expend \$500 in development work by the 20th of July next. If the work proves satisfactory, \$1000 is to be paid on the 20th of September, \$1000 on January 1st, 1892, \$2500 on June 1st, 1892, and \$2500 on September 1st, 1892; \$7500 being the selling price of the claim.

PREPARING TO SHIP ORE FROM GOAT RIVER.—While more or less active preparations are being made to carry on or begin development work on claims in Hot Springs and Toad Mountain districts, the owners of prospects on Goat river are not idle. Jap King is now on the Alice ground, and as soon as the work can be carried on to advantage will begin building a wagon-road from that mine to the steamboat landing of the Kootenay, a distance of 6 miles. The Alice ledge at the depth of 100 feet is nearly 6 feet wide, the ore being a good grade galena.

THE BEST DEFINED LEDGE IN THE CAMP.—There are a number of ledges in Hot Springs district, and each ledge has its partisans. The partisans of the Little Donald ledge, claim it to be the best defined in the camp, and that its continuity has been proved the greatest distance.

DAKOTA.

RICHMOND.—*Deadwood Pioneer*, April 1: Work is steadily progressing at the Richmond mine at Galena, under the superintendency of Prof. Havens. Several drifts that have been abandoned for years have recently been opened up, and some good ore found in them. The main drift still continues in high-grade ore, and the condition of the mine is extremely promising.

LITTLE SQUAW CREEK.—Some specimens of the recent strike of silver ore on Little Squaw Creek were shown in the city yesterday. The character of the ore is white quartz, impregnated with small pieces of galena. The ore shown yesterday does not seem to be very valuable.

TO SHIP ORE VIA THE ELKHORN.—The pile of ore at the Golden Reward chlorination works is running pretty low, and not enough teams can be secured, with the present condition of the roads, to haul sufficient ore to keep the works supplied. An arrangement has been made with the Elkhorn, by which ore is to be shipped over the B. H. & Ft. P. to Piedmont, and then to be re-shipped over the Elkhorn to the chlorination plant. This will commence as soon as the Elkhorn can put in a side track, and 50 tons a day will be shipped. There is now only enough ore at the works to run four days, and the teams are only bringing 15 tons daily. If the Elkhorn does not get its side track in by the time the ore runs out, some arrangement will be made with the D. C., to haul the ore. In case no arrangement can be made, the works will have to shut down, until the roads get in better condition.

IDAHO.

SMOKY.—*Wood River Times*, April 1: Frank Oliver got in yesterday from Smoky, having come on snowshoes to Humphrey's, thence to Hailey by stage. He and his partner have some ore in the Carrie Leonard, and will make a few shipments at any rate, this summer. The Carrie is looking well. The lessees of the Pot-Wrestler also have some ore out and some in sight. The Sunday claim, in which P. M. Bruer is interested, shows some 200-ounce ore—a width of 15 or 18 inches of it. The Silver Star miners are all working in ore. At the King of the West there is a good deal of 400 and 500 ounce ore in sight, and regular shipments will be resumed as soon as the roads are open. Joe Reedy has been working all winter on an ore-claim in the Tyrannis. There is some ore in the Flagstaff. The contractors working in the Galore-Stormy have had a bad time of it all winter. The rock has been hard as chain-lightning, and the water squirts from the sides and face so that they have to keep flat rocks against the crevices through which it comes in order to be able to work at all. And even then they are no sooner at work than they are wet as drowned rats. This indicates the proximity of a strong, well-defined ledge; and, as a matter of fact, the contractors expect to cut it very shortly. As a whole, Mr. Oliver says that there is more ore in sight in Smoky and the outlook for the district is better than it has ever been since the first discovery of surface deposits there.

TUNNEL.—*Idaho World*, April 4: Mose Kemper came to Wednesday from the new El Dorado, the other side of the More creek summit. The tunnel running to tap Mose's ledge is in 128 feet. He thinks it is within 20 feet of the vein. Dunn has sunk a shaft 50 feet on his ledge and has taken out

about five tons of ore that will mill at least 400 ounces of silver per ton. The silver is mostly in the form of chlorides. Dunn is also pushing work on his tunnel to tap his ledge at the depth of 500 feet. This tunnel will be 500 feet in length. It is now in over 100 feet. Mose visited Baoner. He says the Wolverine mine, on the 500 level, is immensely rich and the ledge is 12 or 14 feet wide, all pay ore. The Wolverine is now turning out the richest ore ever taken out in Banner district, even surpassing the rich ore of the famous Banner. The Wolverine is a mammoth ledge, while the Banner vein is small.

MEXICO.

NO GOOD.—*Tombstone Prospector*, April 1: Jno. Kelso returned last night from the gold diggings in Sonora which have created such an excitement in this section. He went there to partly satisfy himself, and partly in the interest of friends who had confidence in his judgment. The report he brings back is anything but favorable. He remained four days in the vicinity of the diggings and prospected them thoroughly. He also observed what others were doing and states that no man is making more than \$5.50 per day. There are about 50 Americans and 100 Mexicans there, and all the white men who can are getting out. Old John Parr is there waiting for Billy Pump to get back. Mr. Kelso met the latter going down. Bedrock is near the surface and is a smooth hard granite. The extent of the ground is a half mile on each gulch. Many Americans down there sent word to friends up this way not to come down. Four men, who were the first Americans in there, have been rocking for a month and have not made a cent, and have quit in disgust. Mr. Kelso will not go back and he advises all his friends to stay away.

MONTANA.

AROUND BUTTE.—*Miner*, April 3: The week in the mining arena of Butte has been one of unusual activity, notwithstanding the fact that very little work has been done at the Anaconda Co.'s property on account of the difference that has arisen between that corporation and the Montana Union Railroad Co. regarding the hauling of ore from the mines to the smelters at Anaconda. Outside of the Anaconda all the smelters, mines and mills have been running full blast, turning out gold, silver and copper in bulk. At the Boston and Montana works a new O'Hara calcining furnace is being built, which is indicative of the anticipation of a season of unparalleled prosperity by the company. Several of the matting furnaces are also being overhauled and put in first-class condition. As to the company's mines, only development work is being done, the ore extracted in driving levels, making upraises, etc., being sufficient to keep both smelters in constant operation. Just think of it! That enough ore can be taken out in doing development work to keep in constant operation two smelters having a daily capacity of 450 tons. It seems like a colossal statement to make, yet it is nevertheless a fact. Of the producers owned by the company the Mountain View, situated at the very pinnacle of the hill, is the largest. It is developed by a 1000-foot shaft, from which crosscuts have been driven to the two veins at intervals of 100 feet. The shaft is sunk between the two veins, and from the points where the crosscuts encounter the ore bodies levels have been driven almost the full length of the claim, opening up immense masses of solid copper-silver ore which will be allowed to remain underground until the new smelter at Great Falls is completed. Raises, too, have been made from one level to another in various parts of the mine, making complete air circuits, so that the workmen will not be bothered with impure air. The entire work of developing this property has been done under the direction of Richard Dawe, the foreman, than whom there is no better miner in the camp. The Colusa mines at Meaderville, also the property of the Boston & Montana Co., are being put in condition to withstand any demand for ore that may be made upon them when the new smelter is in operation. The two combined now yield about 300 tons a day, a mere circumstance to what they can be made to produce. The company, however, realizes that it is of no use to extract the ore unless it can be smelted, and therefore prefers to allow it to remain in the depths for the present. The Colusas are both in charge of Cy Gilbert, a miner of experience, and when the new Lewisohn shaft is completed to a depth of 2000 feet will be capable of producing at least 2000 tons of ore per day for an indefinite period. As is well known by all mining men of the camp, the East and West Colusas are contiguous to each other and connected at a depth of 500 feet, although the shaft of the East claim is 300 feet deeper than that of the West claim. It is not worked below the 500, however, for the reason that the company is desirous of putting in good condition all the ground from the 500 to the surface before going deeper, and this it realizes it cannot very well do without purchasing heavier hoisting machinery. The new shaft, which is being sunk almost on the line between the two drains and which has already reached a depth of 500 feet and been connected with the lower workings of the properties, will be supplied with a hoisting plant that will enable the company to go right on through to the 1000 mark. The Colusas, the Mountain View and the Pennsylvania are great mines and will become greater in time.

SINKING.—Butte *Inter-Mountain*, April 4: Sinking has again actively commenced in some of the larger properties. Foremost among this number is the Moulton. This property has continuously run on the supply of ore above the 700-foot level for the past 12 years and the reserve having become exhausted, the company has commenced a lift of 200 feet during the past week. The Alice having encountered a number of rich shoots of ore and all dipping towards the Moulton ground left no chance for the Moulton but to sink, run their crosscuts and commence the taking out of rich milling ore. The shaft is being pushed in depth both night and day by an eight-hour shift. When completed to the 900 there will be no delay, but the leads will be cut and once more the large mill of this company will be found amply supplied with ore and the mine working both night and day. Among the others that have deemed it the proper time to further develop their properties in this way by continuing in depth are the Germania, Vulcan, Clear Grit and Mountain Con. Others will shortly follow the example, chief among the number being the Parrot, Lewis-

son shaft, Harris & Lloyd, the Monitor Co. in Park canyon and others. One source of consolation for the coming spring and summer is the abundance of water which will insure the continuance without interruption of every smelting plant in the camp unless it be from accident. The placer claims can also have a supply that will last almost the entire season and the output of both silver and gold promises to far exceed any former year if the mines are kept in active operation.

NEW MEXICO.

DEVELOPMENT WORK.—*Silver City Enterprise*, April 3: The El Paso smelter has raised the price on the treatment of copper ores. The Pacific people have enjoined Skillicorn & Snyder from selling or working ore from the disputed ground. Two additional vanners are being put in place at the Pacific mill. When the mill again starts up the fifteen stamps will be dropping. The Pinos Altos mills will soon commence to re-concentrate their tailings and expect to be able to make a marketable product from them. The Lone Monarch mine, of Lone Mountain, which has produced over \$80,000, is now offered for sale by Thomas W. Hinson, administrator of the estate of George W. Manley. The Anson S. Copper company has two cars of copper bars at the depot ready for shipment and will soon have another car ready for shipment. The smelter has been shut down temporarily, awaiting the arrival of a chemist. The present shipment is worth from \$10,000 to \$12,000. Work is progressing on the Flagler reduction works. Laizure & Grabe have the contract for furnishing the brick, and are now about to turn a kiln of 150,000. It is Mr. Waring's intention to have sampling works in connection, where miners can have their ores sampled and sold to any of the smelters of the country.

PINOS ALTOS.—*Silver City Enterprise* March 28: Bell & Stephens have a large pile of beautiful ore on the dump, enough to keep the mill running for a long time. They are still pushing development in the mine. As previously announced in this paper, it is the intention of this firm to have a gold brick of one ton weight on exhibition at the Columbian exhibition, and if the present ratio or output is kept up, they can secure their brick in a few months. They have shipped about 250 pounds of gold in bars this month, to say nothing of the output in concentrates, which is quite considerable. Such a display at the exposition will be a world beater, and will prove to outsiders that we can produce bullion. The *Enterprise* doubts if there is another mining camp in the Rocky mountains which is netting as much profit to the operators as Pinos Altos and yet there is very little talk about the camp. If the camp was located in Colorado or California the mining papers would be full of it, but poor old New Mexico, handicapped as she has been, will soon force recognition as one of the greatest mineral regions in the world. The output tells the tale of prosperity, and men of means will not be long in opening up our vast resources after they are once convinced that the metal is here.

UTAH.

DEMAND FOR ORES.—*Salt Lake Exchange Journal*, April 3: It seems that the duty imposed on foreign silver-lead ores has proved a blessing to the ore-producers of Utah, notwithstanding the assertion of some of the largest smelting corporations to the contrary. The great demand for Utah ores just now is traceable to the fact that the eastern smelters must have fluxing ores, and they have found out that Utah is just the place to get what they want. Hence the keen competition among ore-buyers and the activity in the mining camps where our big producers are located.

FISH SPRING DISTRICT.—Messrs. J. C. Parr and E. J. Watson came in from Fish Springs district, Deep Creek, the first of the week, bringing with them specimens of ore from their claim, the Galena, that has caused considerable excitement among mining men. One specimen, a 60-lb chunk, on exhibition at McLelland & Smith's liquor house on East First South, runs as high as 60 per cent lead and 800 ounces silver to the ton. Stewart made an assay of another sample yesterday that went 72.5 per cent lead and 307.2 ounces in silver. The ore was taken from a ledge three feet wide and only a few feet under the surface. The owners left for the claim this morning for the purpose of sending in a shipment of the ore. They are enthusiastic over the find.

GILSON IN WITH RICH ORE.—*Salt Lake Tribune*, April 5: S. H. Gilson is back from Dugway, and brought in 17,500 pounds of rich ore. This will be sampled to-morrow and the results are anxiously looked for. The mine is in condition for two men to take out and sack a carload of ore in five or six days, and the extent of this body of ore is not known, but is believed to be quite large.

THE ORE MOVEMENT. The past week the roads were so bad that little ore came in from the camps, except from such big shippers as load directly into cars. Of course the bad roads do not interfere with such producers as the Lead Co. at Bingham, the Eureka Hill and Bullion-Beck, Tintic, which load from their bins, but it stops nearly all the shipments from most of the other mines. While this condition cuts off the supply at the smelters from the smaller shippers, the larger ones keep up the bulk so that the smelters are fairly well supplied with ore. Park City was quiet in shipping because of the roads; the Brooklyn, Highland and South Galena sent in their usual quota from Bingham; the Lead mill is running full, but the smaller properties at Bingham are not shipping, while in Tintic the Eureka Hill and Bullion-Beck & Champion Cos. sent in a good quantity of ore. Stockton sent in but little ore during the week, but the miners there are getting in good shape for large production when the weather becomes settled and the roads good.

FURTHER INQUIRY FOR MINES.—One of our real estate men, who also handles mining property, is in receipt of several letters from parties in Philadelphia who are making inquiries about good mines to invest in, either by purchase or in buying shares of stock of good companies. This is an evidence that good work is being done in advertising the great mining industries of Utah, and the business being transacted in the Mining Exchange from day to day. Never before has there been so much interest in Utah mines by the people both East and West as now.

MECHANICAL PROGRESS

Mechanical Draughtsmen.

Thanks to the excellent results of having good trade and industrial schools, the number of skilled mechanical draughtsmen worthy of the name is on the increase. This is a branch of the trade that requires men of more than ordinary shillity, and one, too, resolving only a small share of the credit due it. Upon the draughtsman depends more of the value of a machine when it is finally completed than upon any other workman engaged upon it.

The designing of machinery partakes both of art and science. One writer very truly says: "The true beauty of form in engineering designs follows the same rules as those which render a picture or group of statuary pleasing to the eye, and the graceful forms of a well-designed machine impress the mind with a sense of beauty, of fitness and of power."

For a man to be a good draughtsman it is necessary, first of all, that he should have a thoroughly practical understanding and knowledge of mathematics, especially of geometry and arithmetic. This is essential, because it enters into every detail of practice, and upon the accuracy of this knowledge depends a great deal, not only in relation to his own part of the work, but the work of others who depend upon his drawings and figures.

It is also necessary that he should have a thoroughly practical knowledge of mechanics, so that he can design a machine, every part of which can be easily constructed, simple, durable and symmetrical in all its parts. The importance of this will be seen from the fact that the draughtsman must know to a certainty every operation which the machine must undergo in the process of manufacture, and all the conditions under which it will work when completed. Theory alone is not of any practical use in this. It requires an actual mechanical knowledge and experience.

It is necessary that the design should follow construction to a certain extent. The machine should be built up in the mind before it is attempted to place it upon paper for the instruction of the machinist. So far as possible every part should be studied, and its form, size and its relation to other parts be determined, and all these requirements demand a great amount of very close observation of the practical part of engineering, and a very thorough training in theoretical investigation, which makes it a trade of strict requirements, and calls for a man of more than average ability.—*Manufacturer's Gazette.*

CURIOUS FEATS OF STEEL.—The finest grades of razors are so delicate that even the famous Damascus sword blades cannot equal them in texture. It is not generally known that the grain of a Swedish razor is so sensitive that its general direction is changed after a short service. When you buy a fine razor the grain runs from the upper end of the outer point in a diagonal direction toward the handle. Constant strapping will twist the steel until the grain appears to be straight up and down. Subsequent use will drag the grain outward from the edge, so that after steady use for several months the fiber of the steel occupies a position exactly the reverse of that which it did on the day of purchase. The process also affects the temper of the blade, and when the grain sets from the lower outer point toward the back, you have a razor which cannot be kept in condition, even by the most conscientious barber. But here's another curious feat that will take place in the same tool. Leave the razor alone for a month or two, and when you take it up you will find that the grain has assumed its first position. The operation can be repeated until the steel is worn through to the hilt.

THE ARCHITECTURAL APPLICATION OF IRON AND STEEL.—Of course, the question will have to be considered not merely from a utilitarian, but also from an æsthetic point of view, and in approaching this less familiar ground, an engineer will naturally be unwilling to rush in where angels fear to tread; but there are perhaps a few common-sense principles which may safely be referred to. In the first place every architect is the horn enemy of shams, and if we are seeking to discover the true outlines of a style of iron construction, we must at once set aside every device for disguising the real nature of the material. Massing entablatures and cornices of hollow cast iron can only be regarded as hollow shams, and constitute an offense against good taste, which has been perpetuated often enough, and which reached its greatest extreme, perhaps, in certain buildings that were run up in America, where the entire Gothic facade, with its deep reveals, recessed and richly molded archways and supporting buttresses, were all done in cast iron about half an inch in thickness.—*Iron and Steel Trades Journal.*

ANCIENT LABOR UNIONS.—In the *Cosmopolitan* for March is an article on "Labor Unions in Ancient Rome," by Professor Leipziger, in which he shows the ancient origin of the organizations of workmen which afterward became the guilds of the Middle Ages and the unions of the present day. Corporations, or Collegia, as they were called, of seven trades, musicians, carpenters, goldsmiths, blacksmiths, shoemakers, potters, and a miscellaneous lot of trades all incorporated in one body, existed in

Rome way back in the times of the Kings; Numa is mentioned as their founder. The membership of these Collegia included independent, self-employing artisans as well as wage-workers, just as the guilds of the Middle Ages included the masters and the employees and apprentices. They grew rapidly in importance, and soon branches were formed all over Italy. In Rome they each had a building, in which their meetings and feasts were held. They had burial funds, such as our mutual benefit orders have, and their processions, festivals and anniversaries were frequent. They had full control of their own membership, and members had certain legal rights, such as the privilege of conducting their own law suits. Of course, their objects were mainly to keep up wages and the price of products, and give their members a monopoly of the market. To secure these objects they had to struggle with the non-union guilds and the unorganized labor, just as our unions do to-day, for they had no legal monopoly. Attempts to keep up the price of products led to several imperial edicts, which sought to prevent the corporations from successfully carrying out these "price conspiracies," as old Plautus styled them.

The first organized "strike" of which we have any record is mentioned by Livy as occurring in 312 B. C. It was a strike of the Roman musicians, who, on being deprived of the annual appropriation for their feast, left the city in a body, and refused to return until they received the appropriation. As their services were necessary for religious services, they won the strike without much difficulty.

The unions took an active part in politics, sometimes nominating their own candidates, sometimes endorsing others, and their influence was greatly respected and feared. A letter of the Emperor Trajan, in which he deprecates the political activity of the unions, reads very much like modern newspaper editorials of a certain class. The latter class prejudicially prevailed made the unions more desirous of showing their power politically, for socially a mechanic no matter how rich he might become, was a nonentity. A trader or merchant might buy his way into aristocratic circles, but not an artisan; he was looked on as but one degree above a slave.

PRODUCTION OF IRON.—The fact that the United States has doubled its production of iron since 1882, and is now the largest producer in the world, strange to say, excites little comment on the part of our English contemporaries. The *London Railway News* lets its home readers down easily by prefacing its statement on this head with the remark that, "As might have been predicted from the vast extent of its mineral deposits, the United States has attained," etc. The same journal also finds some comfort in the concluding statement that "the whole of the American production is consumed at home, and is, moreover, supplemented by the importation of a good deal of manufactured iron and steel in various forms." Fortunately, perhaps, for our contemporary, it has made no attempt to fix dimensions to this "good deal," nor to contrast it with the importations from England of a few years ago. Individually, we have no wish to see the United States prosper at the expense of a nation so near akin to us as England; but when American production exceeds home consumption as it must in the natural course of present events we may hear more vigorous comments and suggestions from our neighbors across the sea.—*Engineering News.*

THE USE OF ALUMINUM IN IRON FOUNDRIES. Mr. David Spence in the *American Machinist*, says: During the past winter I have used aluminum in foundry practice and find that it is a splendid thing to make iron fluid and clean. It seems to take all the impurities out of the iron when it is charged in the cupola with the pig iron. Ten pounds of Cowles' ferro-aluminum to 2000 pounds of pig iron will produce good, sound castings, free from blow holes. It is as good in the use of crucible steel as in iron (its effects). It produces a sharp and solid casting, makes a uniform grain. It takes away tendency to chill in cast iron. In steel it reduces the shrinkage and increases the welding properties in both wrought iron and steel. I recommend it to persons making tool castings, such as face plates, and in fact all kinds of work that has to be planed, milled or turned. There is one thing that I like in its use, and that is, it does not weaken the iron or take its strength from it, but rather adds to it. We are having good success with it in sewing machine castings.

OUR EXPORTS OF AGRICULTURAL IMPLEMENTS.—An official report from Montevideo announces that the United States is far ahead of any other country in the supply of agricultural implements and machines in Uruguay. These include plows, plowshares, mowing machines and axes, to which an English journal, the *European Trade Mail* remarks: "Reaping and mowing machines are obtained almost exclusively from North America, while Great Britain holds the market with respect to threshing machines. We are also first as regards spades."

OREGON'S GREATEST FOREST.—It is said there is a tract of forest trees in Southern Oregon embracing about 16,000 square miles, which, out and sold at \$10 per 1000 feet, would pay our National debt twice over. It is estimated that the amount of merchantable timber standing will reach 400,000,000,000 feet.

SCIENTIFIC PROGRESS.

A Study of the Axis.

During the last few years direct observations for latitude, repeated at a given station, have indicated a change of latitude; or, in other words, a change in the direction of the earth's axis. Other observations bearing upon the problem have been examined at the older fixed observatories, but the deductions are not accordant. Last year the matter was brought before the International Geodetic Association, and at the meeting of the Permanent Commission at Freiburg the results of a systematic series of latitude observations made at the observatories of Berlin, Potsdam and Prague were presented in tabular and graphic forms to the members and invited geodists. These observations indicated a change of the direction of the earth's axis almost identical at the three stations. In the discussion which ensued the results at other observatories were introduced to show different values and thus to indicate some other than a common cause. Nevertheless, a consensus of opinion was adopted, asking the co-operation of other observatories to further test the question. Prof. Mendenhall, Superintendent of the United States Coast and Geodetic Survey, was invited to co-operate, and several of the officers of that corps will take part in the systematic and simultaneous series of observations that will include work in the northern and southern hemispheres. On this, the Pacific coast, Dr. Marone, representing the International Geodetic Association, will reach San Francisco about the middle of the month and fix his station upon one of the islands of the South Pacific. On behalf of the Coast and Geodetic Survey, Mr. Preston will arrive about the same time and establish a station in the Sandwich Islands, where he has already made many latitude and gravity determinations for the Hawaiian Government. At San Francisco, the necessary observations will be made by Prof. Davidson of the Coast and Geodetic Survey.

The series of observations will extend through many months and will be made upon every available night at these and all other stations.

Several suggestions have been made to account for the observed changes in the latitude, such as the change in the refraction; slow but irregular hydraulic changes in the surface of the earth at given localities; slow but irregular changes in the level of the surface of the earth from the effects of solar heat; the irregular accumulation of ice caps at the poles of the earth, etc.

With skilled observers in Europe and in the Atlantic States, we must expect that some definite results will be obtained, either as pointing more directly to the cause of the apparent irregular movement of the axis of the earth or as indicating more definitely the necessity and character of further observations.

The Sap of Trees.

A keen observer and ingenious experimenter has been writing a book on "Sap: Does it Rise from the Roots?" a question which he proceeds to answer with a decided negative. To those who merely "run and read" the whole question and answer may appear as a very light matter indeed. In reality, however, the right answer to the question is of great moment to us all. In the first place, a negative reply simply means the ruthless uprooting of all our preconceived ideas, the reversal of what has been taught in our schools for ages. It is true that, if we examine into the theory of plant growth as set down by botanical and biological authorities, we find that they disagree among each other to an astonishing degree. They all, however, join in declaring that trees and plants derive sap from their roots and breathe in gases by their leaves. How the sap rises, whether by capillary attraction, endosmosis, root pressure, suction, or evaporation, or a combination of all (described by Professor Huxley as pulling, pushing, and dumping), the greatest biologists, including Herbert Spencer, Sachs, Huxley, Darwin, and others, have by no means been able to prove. They all, nevertheless, endorse the theory of rising sap, and agree, moreover, that it rises in spring and descends in summer. Now, if all this theorizing is proved to be wrong, we shall not only have to alter our school teaching, but largely modify our agricultural practice. Clearly, if the roots suck up, absorb, or otherwise collect moisture and the organic and inorganic constituents of sap from the soil, then the soil will quickly become exhausted and require constant feeding, while the leafy parts of the plants must be cut and pruned down. This is the present practice. And it is certainly worthy of remark that our best cultivated—according to the theories of the day—orchards and gardens are those that suffer most readily from blight and disease generally. Our new botanical revolutionist, Mr. J. A. Reeves, with his book on "Sap" tries to prove that we are altogether on the wrong road; that sap does not ascend, but descends, and that gas does not descend, but ascends in all trees and other plants. To the unprejudiced physiologist and mechanician this theory of Mr. Reeves seems by far the most credible and intelligible.—*Exchange.*

EARTHQUAKE PHENOMENA.—In the Ninth Annual report of the Geological Survey of the

United States, Captain Dotson presents an able and exhaustive discussion of the famous Charleston earthquake of August 31, 1886, the results of which are of much value. The earthquake is remarkable as one of great severity, taking place independently of any region of volcanic activity. The conditions existing for obtaining a full record, over the country involved, of the time, duration and effects of the earthquake, were on the whole unusually favorable, and some 4000 reports from 1600 localities were collected by the Geological Survey. The chief scientific result from the study of the earthquake is the conclusion as to the speed of propagation of the earthquake wave, the result being 236 meters per second. This velocity is not only entitled to much greater weight than results obtained in connection with similar phenomena elsewhere, but, further, it agrees closely with the calculated rate of propagation of a wave in an elastic, nearly homogeneous, solid medium of materials corresponding to those here involved. There were found to be two epicentral regions near Charleston, one 15 miles northwest, near Woodstock, about which the isoseismals are nearly circular, the other to the south of this and 12 miles west of Charleston, on Rantowles Creek, with oval isoseismals, the major axis extending toward Woodstock. At the former center the deduced depth of the focus is 12 miles, with a probable error of two miles; at the other the material for conclusion was less satisfactory, but the depth is made about eight miles.

CORAL GROWTHS ON SUBMARINE CABLES.—Very little is as yet known as to the rate of growth of corals, but some very interesting details have been published by Prof. Alexander Agassiz in the *Bulletin* of the Museum of Comparative Zoology at Harvard University, with regard to a series of specimens which were taken in June, 1888, off the Havana and Key West cable, from a portion repaired in the summer of 1881. Consequently the growth could not have been more than those of about seven years. It must be noted that this portion of the cable was laid at a depth of only from six to seven fathoms, and that the district in which it was laid was most favorably situated as regards food supply to the corals. Some of the apertures belonged to species whose rates of growth had never before been recorded. Verill mentions that the thickness of the *Orbicella annularis* coral formed in 64 years was not more than about 8 inches; the specimens from the Havana cable grew to a thickness of 2½ inches in about seven years. *Manicina areolata* has grown to a thickness of 1 inch; while *Isophylla dipacea* shows a still more rapid growth, projecting 2½ inches above the cable. Of course it is quite possible that these corals are of less than seven years' growth, but it is not probable that more than a short time passed before some of the swarms of pelagic coral embryos which must have floated past the cable found a place of attachment thereon.

VARIATIONS OF LATITUDES.—Experiments recently made in Germany have added convincing evidence to a fact already noted, to wit, the variability of terrestrial latitudes; for example, the latitudes of Berlin, Potsdam and Prague diminished between August, 1889, and February, 1890, about half a second of arc. In the latter year, between April and August, the latitude of Berlin increased four-tenths of a second. In other words, Berlin is nearer the North Pole in summer than in winter. The periodicity of these variations would indicate that the direction of the earth's axis, under the influence of some external or internal disturbance, was changing. This phenomenon is attracting very considerable attention.

PREPARATION OF GLASS FOR OPTICAL PURPOSES.—A new method for the preparation of glass for optical purposes has been devised in Sweden, and, according to *Revista di Artiglieria e Genio*, has met with marked success. The main improvement is said to consist in adding to the composition of the glass certain quantities of phosphorus and chlorine, which impart to it an absolute transparency, great hardness, and susceptibility of the finest polish. For achromatic lenses and fine optical instruments this glass is far superior to any make hitherto known, and it is said that the power of microscopic lenses can be greatly increased by this process.

THE RESPIRATION OF INSECTS has been the subject of study by M. Contejean, who has found that, contrary to what takes place in vertebrates, the movement of inspiration is passive and that of expiration active. The air is driven from the body by a contractile effort. Hence, when the insect is wounded, the flow of blood occurs at each expiration. The respiratory movement is not interrupted by cutting off the head, nor by the absorption of cyanide, which produces an immediate cessation in man.

SPIDERS differ from insects in five minute particulars: Their eyes are simple instead of compound; they have eight legs instead of six; they do not pass through the metamorphoses which are characteristic of insects; they have no antennae, and their breathing is accomplished by means of organs which combine the functions of lungs and gills instead of by tubes pervading their bodies.

THE ORGANS OF SMELL in the turkey vulture and carrion crow are so delicate that they can scent their food for a distance of 40 miles.

ELECTRICITY.

The Electric Railway.

We condense the following from a correspondent of the *Manufacturers' Gazette*: Great progress has been made in street transportation in all the great cities of the United States within the past few years, and nearly every town of any size throughout the country is realizing the necessity of providing some means of rapid transportation to its residents. A street railway system is likened to a number of great arteries carrying passengers to and from the heart, of the business center. Few people realize the immense business which is done by these railway companies.

There are at present five common methods of street transit: Elevated steam roads, steam dummies, horse-cars, cable-cars and electric roads.

To the first four there are many objections, which it is believed are obviated by the introduction of electricity.

An extra electric-power-house can be maintained at much less expense than can a large stable of horses, and both of these are necessary in an emergency.

In improving the present means of street-car propulsion by electricity, there is undoubtedly a great field open to the inventor, and such improvement would benefit the masses quite as much as anything else.

The electrician's part of the work has been well done, but the wear and tear on the mechanical parts of the system must be obviated by some means.

It is exceedingly difficult to answer as to the question of durability, as the cars have not been long enough in use. By use of the electric cars in Boston, the average speed of street cars has been increased from six to eight miles per hour.

A brief description of an electric railway as usually constructed is as follows: A power-house contains dynamos, which generate the electricity. This current is carried through a wire strung over the rails, thence down the trolley pole on the car to the motor, causing the motor armature to revolve; thence is passed through the gears connected with the car axle, and from the car-wheel returns, via the track, to the power-house, thus completing the circuit. The car is reversed by reversing the direction of the current through the motor, and is stopped by breaking the circuit. About two years ago an attempt was made to run electric cars in Boston without the aid of an overhead wire; instead, a conduit was placed in the ground near the track, and the current was taken from this, but this did not work satisfactory, as the opening became clogged with foreign matter, and for other reasons. Inventors are now at work devising some means whereby the conduit can be closed.

The propulsion of cars by means of storage batteries has also been tried, and some lines are working now, but the power required of the batteries is much greater than they can yield for any length of time.

So it seems that at present the only feasible system of electric propulsion is by the overhead trolley system.

ELECTRICAL WONDER WORKING.—The popular idea of electricity is to look upon it as a myterious force, coming from nowhere in particular, doing very nearly what it pleases, and equally able to produce a spark and a general derangement of the universe. There is a tendency on the part of certain people to contemplate as an African does his gree-gree a wonderful and ineffable something that need only be invoked to produce almost any result that can be named. This spirit has, perhaps, bastened the march of electrical industries, but it is certainly unworthy to encourage it. The sooner people are brought to look upon electrical power as only one of the protean forms of energy, as subject to known laws, and quite transformable into other kinds of energy, the better for everybody concerned. To be sure, we do not know what electricity is; in fact, it is quite probable that it is not a separate entity at all, but on the other hand, we do not know what the force we call gravitation is. Yet the action of both under given conditions can be foretold with considerable accuracy, and perhaps we should not be able to do much more with them, if Nature should yield up her profound secrets and set the unquenchable curiosity of man at rest. Look at electrical energy as a force obedient to certain laws, known and unknown, able to accomplish much in skillful hands, but do not imagine it as ready to do all sorts of marvelous things without any particular method in its madness. Electrical education has done much to familiarize men with the correct ideas of the subject, and probably this distributive teaching plainly enough that there is still much missionary work to be done.—*Electrical World*, N. Y.

ELECTRICITY AS A MEASURE OF THOUGHT.—Mr. J. L. Bain says: It is well known to the medical profession that every mental effort causes a rush of blood to the brain, and that the amount of blood depends on the "intensity" of the thought; but rush of blood means a rise in temperature, and if we could measure this we would be able to determine, in a rough way, the "power" necessary for the generation of any thought or mental effort. I accomplish this object in the following manner: I have a

head gear of some light, high-conducting (heat) substance. In its middle or any other convenient position I fix a thermo-electric pile, and connect this, by means of flexible wires or otherwise, to a sensitive galvanometer. The extreme sensibility of the thermo-electric pile is well known, and therefore whatever rise in temperature takes place, consequent to the rush of blood, would be instantaneously indicated by the galvanometer. The utility of such an apparatus may not appear at first sight of great importance, but if we consider for an instant the facility or difficulty with which children at school learn their lessons, any doubts we may have entertained as to its practicability will be immediately dispelled. By such a contrivance we could ascertain the "brain power" of boys and girls, nay, even men, and thus be in a position to indicate in what direction their mental efforts ought to tend.

GOOD HEALTH.

ETHER DRINKING appears to be a new form of intemperance which is just now creating much excitement in Ireland. The *London Times* sets it down as the true source of most of Ireland's woes. That journal has given a very elaborate account of the new tippie, the very existence of which was almost unknown until quite recently. The drink is a very impure form of ether and the results are most deplorable in character. The use of this new intoxicant has as yet spread through only four or five counties, but its march is onward and it is thought that it will continue to spread until all Catholic Ireland is involved. Insanity is rapidly increasing where this drink is used, and the death rate among the children of the ether-drinkers is very large. In Drapertown, with a population of only 9500, it is said there are not less than 6200 drinkers. In five of the northeastern counties, including Tyrone and Derry, where there is a population of 350,000, there are said to be 46,000 confirmed drinkers.

THE NEW YORK PASTEUR INSTITUTE appears to be doing good work in the prevention and cure of hydrophobia. The institute commenced work in February, 1890, and according to the annual report recently instituted it had received 823 persons bitten by dogs or cats. Of these, 643 received wounds from animals which were not mad, consequently their stay was of brief duration. In 185 cases anti-hydrophobic treatment was applied, the fact of the animals inflicting the injuries having hydrophobia being either clinically evidenced or proven by inoculation in the laboratory, and in numerous cases by the death of other persons or animals bitten by the same dogs. No death occurred from hydrophobia among the patients inoculated. Indigents were treated free of charge. Only 51 patients were received from the State of New York. The balance were from 25 different States, one going from Arizona and one from Canada. The result of the treatment has been a most perfect success.

CONSUMPTION AND CANCER.—The use of the lymph cure for consumption in this city is now generally conceded to be a failure, and we understand that there is now no special call for treatment; and since the Koch cure for consumption has got the go-by, Cook's cure for cancer is beginning to attract increased attention among many of the more considerate of our medical fraternity. The success attending the treatment of several very pronounced cases now in hand is proving a most agreeable surprise to many deeply interested persons, among whom are several physicians. We are assured that this cure will soon be taken up and thoroughly investigated by persons whose report, when made, will be most unhesitatingly accepted as beyond dispute. That it will be feasible goes without saying.

CARE OF THE BRAIN.—The brain stands the most abuses of any organ in the body. Its best tonic and stimulant is success. The worst and most depressing thing to it is failure. The most injurious effects come by using stimulants in early life. Young people should never use liquors, tea or coffee. The latter two may not exactly do harm, but they are conducive of no good. They act mostly on the brain and injure its growth very materially. Abundance of sleep is necessary. Eight hours is not more than enough. Sleep is the time of relatively lowered expenditure and increased repair.

THE BLACKENED TEETH of the Malay and Siamese are not produced, as has been supposed heretofore, by coating them with a mixture of betel and lime, but by rubbing the teeth with a paste made from charred cocoanut kernels. This is carefully applied to the teeth again and again, until a black varnish hides the natural white.

HYDROPHOBIA LONG DORMANT.—A telegram from the town of Mexico, in Missouri, says that William Garner, who was bitten by a mad dog about 20 years ago, died on the 25th ultimo. He was so violent during his illness that four men had to be kept with him all the time. His sufferings were terrible.

LOSS OF BODILY MOISTURE.—We lose two pounds of water in 24 hours by perspiration, and the more we perspire the cooler we become. There are 27,000,000 pores on the surface of our bodies, which, if placed in line, would extend 28 miles in length.

ENGINEERING NOTES.

The Jet System of Propulsion.

We have heard but little of the jet system of propulsion since the trial trip of the "Evolution," which steamed some 25 miles down New York harbor in November last, but succeeded in making only about one-third of the speed which had been calculated upon. The experiment cost the projectors about \$100,000, but whether the idea has been given up, or whether further experiments are to be made, to seek for some means of displacing the ponderous screw shaft and propeller, which all acknowledge is but a clumsy affair at best, is not known.

Water-jet propulsion is no new idea. Over 100 years ago, Mr. Ramsey placed a 50-foot jet-bomb on the Potomac, which made about four miles an hour. Watt experimented in the same line, and many others have also made unsuccessful essays.

All admit that the system is a most desirable one if it can be made a practical success. Its advantages would be simply tremendous, and their importance beyond comprehension. About one-half of the cumbersome machinery of a steamboat would be dispensed with in a jet-propeller, while the other advantages attainable would be equally important. All that would be needed would be a boiler and the simplest form of a steam-pump. By means of its enormous pumping capacity, a leak, however large, could scarcely endanger the vessel. The pumps would readily meet any possible exigency in case of fire. By opening bow-jets on either side, any ship, however large, could be turned almost or quite within her length; while she could have the full force of her power instantly applied to stopping her headway, when required. The jet applied to war vessels would possess great advantages in manœvering, while with her sides properly protected, no possible harm could come to her means of propulsion. There would be no racing to the jet propeller, no fractured shafts, no broken propeller, no loss of crew. A successful propeller will crown its originator with both profit and honor.

In most jet-propeller experiments hitherto attempted, the endeavor has been to make use of a very large jet nozzle. In the Fleischer experiment, made in Germany in 1879, the jet nozzle was about 40 square inches in area, which, with 100-horse power, developed nine knots.

The Thengroft experiment on the Thames in 1882, with a nozzle 9 inches in diameter and 170-horse power, developed a speed of ten knots.

In the late experiment with the Evolution in New York harbor, her originator, Dr. Jackson, held that a larger jet was a great mistake. He accordingly went to the opposite extreme and provided his boat with a small jet of only three-quarters of an inch jet, but propelled with a pressure of 2500 pounds to the square inch, which gave a velocity of 609 feet per second. She was a much larger boat than either of the ones above referred to and driven by a Rolocots safety tube boiler of 1200 indicated power. The power needed on the trial trip was said to be about 250. The speed obtained was only ten miles an hour.

There is a remarkable uniformity in the speed attained by these several boats, especially where the great diversity in propelling power is concerned. The displacement of the several boats was as follows: 14½ tons, 21 tons and 100 tons.

These experiments can hardly be considered as exhaustive, in view of the wide difference in conditions, especially between the two European boats and the American. It is scarcely conceivable how any engineer could think of beating the best type of propeller boat with a three-fourths inch jet of water in a boat of 100 tons displacement. It is possible, however, that a gradual cooling down of the nozzle is from the European experiments, and a proper adjustment of displacement and power may reach the happy medium, which will lead to success in revolutionizing the marine propulsion of the world. Further trials in this direction would be looked for with much interest.

A WORLD'S RAILWAY.—America, argues ex-Governor William Gilpin of Colorado, is a fallow continent, capable of sustaining half a billion people in happiness and plenty. It is the mission of the United States to be the distributor of food to the hungry of both Europe and Asia, lying as it does, midway between them. The time is at hand when all the ships of the seas will not be sufficient to carry the articles of commerce around the world to the nations fast enough. Then will come necessity for more rapid transportation. The plan of this transportation has been the dream of Gov. Gilpin for 47 years, and he prophesied its construction at an early date from that time. He has made one more prophecy. It is that the next great project in the world's material development will be the building of what he calls the Comopolitan railway—a railroad which shall gridle the earth. The first link in the chain is the Transcontinental road of the United States. Starting from the western terminus of that, the Comopolitan road will extend northward through Alaska, skirting the base of the Rocky mountains, where are plateaus that will render the building easy. Then will come Behring's strait, 48 miles wide, with a large island at its very center. There are no loc-

bergs in the straits, and it is shallow water all the way across with hard bottom and no engineering difficulties. Once across, the road would connect with the Russian railway through Siberia, connecting again with western and southern roads through Asia, Europe and Africa, and the work would be done.

USEFUL INFORMATION.

COMMERCIAL DRUMMERS OF ENGLISH ORIGIN.—An American who visited England more than half a century ago, when the commercial drummer hardly had an existence in this country, writes of this class of people in England as follows: "The commercial traveler is generally a young and very shrewd individual, possessing great savvy of manner and a remarkable ability to suit himself readily to all the varied moods of his varied customers. Furnished by his principals with choice samples of their goods, he steps into his chaise, or the stage, and with a light heart commences his circuit. At each town upon his route he tarries at the principal inn, where he is sure to find a hearty welcome. After thus ensconcing himself in comfortable quarters, he arranges his samples, and if it be forenoon puts them under his arm and issues forth to visit the storekeepers. Wherever he goes he is met with cordiality. Like all travelers, he is full of anecdote, and has at his command the rarest news of the time. None are more glad to see him than the storekeepers' wives and daughters. To these he imparts the most recent scandal and the latest fashions, affording them subjects for gossip until his next visit to the town. To the tradesman he lauds his samples with all the eloquence and ingenuity of which he is capable, and seldom leaves without making considerable bargains."

THE ANT'S JAW.—The grip of an ant's jaw is retained even after the body has been bitten off and nothing but the head remains. This knowledge is possessed by a certain tribe of Indians in Brazil, who put the ants to a very peculiar use. When an Indian gets a gash cut in his hand, instead of having his hand sewed together, as is done in this country, he procures five or six large black ants, and, holding their heads near the gash, they bring their jaws together in biting the flesh, thus bringing the two sides of the gash together. The Indians pinch off the bodies of the ants, and leave their heads clinging to the gash, which is held together until the gash is perfectly healed.—*Medical Record*.

SHOOTING LOGS.—The feat of shooting logs over the Snoqualmie falls, 60 miles east of Seattle, has long been talked of among the loggers. It is well known that above that cataract stand many millions of feet of fine timber, some of the best known in the State. This is inaccessible except by the means proposed, and hence the project thought of. The falls are over 400 feet high and at certain times of the year the flow is quite reduced. During freshets, however, there is an immense volume of water there, and then would be the safest time to float the logs down over. Several loggers, the most enthusiastic, claim they have tried the experiment and found it to work well.

GOLD IN DENTISTRY.—The French scientist, Victor Mennier, asserts that the American dentists insert in American teeth, each year, the enormous amount of about 1800 pounds of precious metal, which represents nearly \$450,000. This gold is buried with the person in whose mouth it is placed. Making allowance for the rapid increase in the population of the United States, and for the continued deterioration of American teeth, it would appear that in less than 100 years the American cemeteries will contain a larger amount of gold than now exists in France.—*Mining World*.

THE DAY OF OPPORTUNITIES.—This is an age for practical and thoughtful men in every line of trade and profession, or there is encouragement for those who are ambitious and energetic. There was never a time in the world's history when the opportunities were so great and openings more numerous for the attainment of position and influence. For the workingman, there is every opportunity to rise, to become a skilled and competent artisan, to excel in his line of work.—*Ez*.

THE GREATEST RAILROAD POTENTATE.—It seems a fabulous statement, but parties who claim to be posted make the statement that Jay Gould controls about 40 per cent of the railway mileage of the world. He does not, of course, actually own that amount, but has his plans so laid that the roads are under his control. This is power with a vengeance.

BOOTS WITH STONE SOLES.—A German inventor proposes to make boots with stone soles. He mixes with a water-proof glue a suitable quantity of clean quartz sand, which is spread on the thin leather sole employed as a foundation. These quartz soles are said to be very flexible and almost indestructible, while they enable the wearer to walk safely over slippery roads.

A WET silk handkerchief tied, without folding, over the face is a security against suffocation from smoke. It permits free breathing, and at the same time excludes the smoke from the lungs.



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Business Announcements.

(NEW THIS ISSUE.)

Mine Wanted—"Engineer," Helena, Montana. Assessment Notice—Gray Eagle Mining Co. Dividend Notice—Pacific Coast Borax Company.

See Advertising Columns.

Passing Events.

The blue-grass region of Siskiyou county is being pretty well prospected just now, and seems to be more extensive than was at first supposed. A number of companies and individuals are at work and borings are being made. The prospects of the county as a mining field are encouraging.

Several people who went over into the Pah-rump valley region, where the alleged lost Breyfoyle mine had been found, have returned with the information that its merits have been exaggerated. There are numerous ledges, but of too low a grade for profit in such an isolated place.

The celebration of the 100th anniversary of the establishment of the American patent system began at Washington on Wednesday, in accordance with the program published in the PRESS.

Announcement is made of new gold fields in China and diamond fields in British Guiana, both so distant as to attract little attention here.

Two very important mining decisions were rendered this week, and are published in another column. One in effect lets the miners alone in the odd sections claimed by the railroad in Montana; and the other definitely settles the question of mineral claims on town-site entries.

It is estimated that \$50,000,000 are invested in the lumber business on this coast.

Mineral Lands and Town Sites.

The U. S. Supreme Court has at last made a direct decision on the subject of mineral lands on town site entries, after having several times passed upon it by inference and implication. The decision reverses the judgment of the Supreme Court of Montana. A. J. Davis held title to certain lands in Butte, under the town site entry act, one provision of which is that no title shall be acquired under the act, to any gold, silver or copper mines, or any valid mining claim held under existing laws.

Henry Wiebold, claims a title under existing mining laws, and when Davis offered to prove that at the time the patent of the Butte town site was issued the premises in dispute were not known to be valued for minerals of any kind, objection was taken on the ground that Wiebold's patent showed that as a matter of fact the premises did not contain valuable mineral land, and as such could not be granted by a town site patent. The Court sustained the objection, and this ruling, which was really decisive of the controversy, the U. S. Supreme Court now overrules.

The Court in the opinion, which is written by Justice Field, says: "The important question is whether, in the absence of knowledge that there were any valuable mineral lands within the town site, Davis can be deprived of premises purchased and occupied by him because of the subsequent discovery of minerals in them, and the issue of a patent to the discoverer. After much consideration we have come to the conclusion that this question must be answered in the negative. It is true that the language of the statutes touching acquisition of title to mineral lands within the limits of town sites is very broad, but in strictness they import only that the provisions of the town-site law shall not be the means of passing title also to valuable mining lands. We think they must be held merely to prohibit the passage of title to mining lands then known to exist, and not to prohibit the acquisition for all time of mines which then lay buried unknown in the depths of the earth.

"The object of the Town-site Act was to afford relief to inhabitants of cities and towns upon public lands by giving valid title thereto. Under such protection many towns, with buildings of great value, have grown up. It would in many instances be a great impediment to the progress of such towns if titles to those lands occupied by their inhabitants were subject to be overthrown by the subsequent discovery of mineral deposits under their surface. If their title would not protect them against the discovery of mines in them, neither would it protect them against invasion of their property for the purpose of exploring for mines. The temptation into such exploration would be according to the suspected extent of minerals, and being thus subject to indiscriminate invasion, the land would be to the one having the title poor and valueless, just in proportion to the supposed richness and abundance of its products.

"We do not think any such results were contemplated by the Act, or that any construction should be given to it that would lead to such results."

Mines on Odd Sections.

The U. S. Circuit Court at Helena, Montana, has rendered a very important decision in a contest between the Northern Pacific Railroad and Helena citizens on the subject of ownership of mines on the odd sections of land granted to the road. The decision is favorable to the miners, but the Court holds that the Northern Pacific grant is different from any other of the several railroad companies. The question at issue was defined by the Court as follows: "Whether or not a mining location made according to law upon an odd section of land within the limits of the Northern Pacific Railway Company's grant, and an application having been made by the locators thereof for a patent for such claim in the Land Office as mineral land, and claiming it to be such, and producing all necessary proofs of location, mineral character and work accompanying such application as is required by law and the rules of the Land Department, and which application is pending and a contest in regard to the right of the applicants to patent the same is existing in the United States Land Office at the time the railroad of the said company was definitely fixed, whether such mining location

is sufficient to take such land out of such grant, although admitted now to have been non-mineral in character and hence not subject to the Mineral Land act."

The Court holds that the filing of a general map of the route did not put into effect the withdrawal of the odd sections, but the lands granted were determined by the exact fixed route. Therefore, mineral claims or homesteads acquired prior to the designation of the route of the road were not void.

The decision of the Court is to the effect that the right of the Northern Pacific Railway Company did not attach to the odd sections until the line of definite location had been fixed and filed, as required by law, with the Commissioner of the General Land Office. The Court holds that there was a valid claim existing prior to, or at the time of, the definite location of the route of the road, and consequently the grant did not attach to the land in question. This decision validates a large number of claims of a similar nature to which contests had been filed by the railroad company, and which will now most likely be withdrawn.

Naval Designing.

The London Times, in speaking of our new navy, thinks that when the American iron-clads carry a full coal supply, their speed will be largely reduced. It says also: "If the greater boldness of the American designers is really based upon sound judgment, we need not regret it. We shall equally profit in the long run by their experience, whether it results in failure or success. We may, therefore, watch with keen sympathy workers on the same problem."

The question of design of vessels is a highly important one. Our international yachting contests have, in recent years, brought to the front both professional and amateur designers of no mean ability, and we have proven our nautical supremacy in this line at least. But in the branch of naval construction, one of the highest industrial importance, there are few opportunities for young men to acquire an education. The college and technical schools neglect this subject almost entirely.

As we are becoming a ship-building people on this coast, naval design and architecture should receive more attention here than is now the case. Senator Stanford, who is desirous of giving a practical education to the students of the university which he has established to the memory of his son, might do well to consider the desirability of including, among other things, the science of ship-building and design. Properly established and conducted, students in this line would come from all over the United States, for education in this direction.

The mathematical features of the science of navigation are taught now in the colleges, in a crude way, but he who is to follow the sea as an officer must attend a nautical school or obtain his experience on the deck of a ship. But in designing models of hulls, the study of form of ships and steamers, there is now no opportunity for a young man to perfect himself, except in the shipyard itself. Even there he is at a disadvantage, for the yard is distinct from the designing loft.

American ship designers of note have been very few as compared with the numbers of originators in other lines of industrial development. It is probably the case that opportunity to study the subject has been lacking. Senator Stanford has an opportunity to establish a new and valuable branch of study, the effects of which would soon make itself felt in one of our leading home industries. Our ship-building interests are sure to increase on this coast, and it will be well to prepare our young men with technical, scientific knowledge in that direction. Opportunity for experiment and practical illustrations in the direction of form of hull, power, marine engineering, etc., would be excellent at Palo Alto, with the bay near by, and large ship-building plants not many miles distant.

YELLOWSTONE PARK INCREASED.—By a proclamation issued by the President last Saturday there is added to the Yellowstone National Park a strip of land about 20 miles wide on the east side, and a wider strip on the south, extending over the great Rocky Mountain Divide, as far west as Idaho.

A CAVE occurred on Tuesday at one of the mines of the Detroit Copper Co., Clifton, A. T., but no one was hurt.

The Niagara Falls Power Plant.

Contracts for the drain tunnel for the great Niagara Falls power scheme have already been let by the Cataract Construction Co. of New York and the work is under way. This company, with a view of procuring the best possible technical advice as to the means of carrying out this work, invited plans from prominent engineering establishments in America and Europe. These plans were submitted to an International Commission composed of representative engineers from the United States, Great Britain, France, Germany, Switzerland, etc., with Sir Wm. Thompson as president. This board was convened in London and has been in session for the past month, having just concluded their labors and made their awards.

The Pelton Water Wheel Company of San Francisco was among those invited to submit plans, which embraced provision for a 120,000 horse-power plant in blocks of 20,000 horse-power each, and included the various systems of transmission of power called for, to wit: electric, hydraulic and pneumatic, it being the purpose of the company, after supplying local wants, to transmit a large part of the power developed to Buffalo.

Information has just been received that the plans submitted by the Pelton Company of this city have been favorably considered by the Commission and awarded the premium. They were the only plans from the United States relating to power development that had any recognition. This undoubtedly insures the adoption of the Pelton wheel for the greatest water-power plant in the world.

The wheel, as is well known, is an evolution of the old hurdy-gurdy wheel used so many years in the mines of California. The improvement, however, is based on scientific principles, which cause its remarkable efficiency, and have made it so markedly popular, not only in this country, but in South America, Australia, and other countries.

The invention of this simple water-wheel was not an accident. Its originator worked steadily for several years perfecting its details. He was at the time a resident at Nevada City, in this State, and had opportunity there for very elaborate tests on comparison with the turbines and other forms of water-wheel in general use. Very many forms and designs of buckets were tried under different conditions, and submitted to accurate and exhaustive comparative tests. Finally the form now so well known was adopted and it has given a degree of efficiency in every way satisfactory.

Now, coming into competition with all the water-wheels of this country and Europe, it is adopted as the motor in the largest water-power plant ever attempted, which is a sufficient evidence of its efficiency. Not only the inventor, but the manufacturers in this city are to be congratulated on this success. As much depends, moreover, on the manner in which the claims of a device of this kind are presented before an examining commission, praise is due to that skillful mechanic, John Richards of this city, who prepared the elaborate plans and specifications for the proposed plant. Inventor, manufacturer and designer are all residents of San Francisco.

THE CONS. VIRGINIA.—The Cons. Virginia and California Mining Co. is coming to the front again as a large bullion producer with dividends promised in the near future. In round numbers the bullion output for the month of February was \$133,000, and in last month it was \$172,000. The average battery assays in February was \$21.78 per ton, and in March, \$25.57. So far in this month they are higher than at any time in March. The company gained in March over and above all expenses, considerably over \$30,000. By the last of this month increased milling facilities will be secured, when the bullion output is expected to be increased correspondingly.

DESIGNS FOR COINS.—The Director of the Mint has issued a circular to artists for new designs for subsidiary coins. The general features of the present coins will be preserved to a considerable extent. The coins to be changed are the silver dollar, half dollar, quarter dollar and dime. These changes are to be made under the Act passed at the last session of Congress, which appropriated \$150,000 for the purpose, which sum is available on July 1st.

Coarse Ore Quicksilver Furnaces.

In a paper read some time since before the American Institute of Mining Engineers, Prof. S. B. Christy, of the University of California, described among others the continuous coarse ore furnace in use at the New Almaden mine, Santa Clara county, and which is illustrated herewith. They are coarse ore shaft roasting furnaces with exterior firelog. As will be seen from the horizontal sections and top view, the lower half of the furnace is a regular hexagon with shutments at the alternate sides. These shutments contain the fire, ash and draw-pits. Vertical section *AB* shows this still more clearly. Each shutment has on its face a fire-door and ash-pit door, which latter also commands the discharge-door for the spent ore. The spent ore, after being drawn from the cooling-pit of the shaft into the ash-pits, is left there until its fumes are exhausted, and is then drawn into the slag-cars through discharge-doors. These discharge-doors are placed on the side of each of the three shutments, lower down than the ash-pit doors. One of them is shown on the side of the shutment seen in the elevation.

The upper half of the furnace is cylindrical. It is closed at the top by a flat dome which contains the charging apparatus in the center. The fumes of the furnace are removed from the vapor chamber at top of the shaft above the surface of the ore, by means of iron pipes 12 inches in diameter. By means of short cast-iron pipes, these holes are connected with a cast-iron down-take by means of a rectangular system of pipes which encircles the head of the furnace. These pipes, inclined downward at an angle of 10°, lead into the condensers. To keep the pipes clear of soot, they contain small discs of iron. These discs are moved by iron rods, passing through stuffing-boxes at angles of the pipe system. They are only occasionally used, and the piston-rods are luted with clay when not in use.

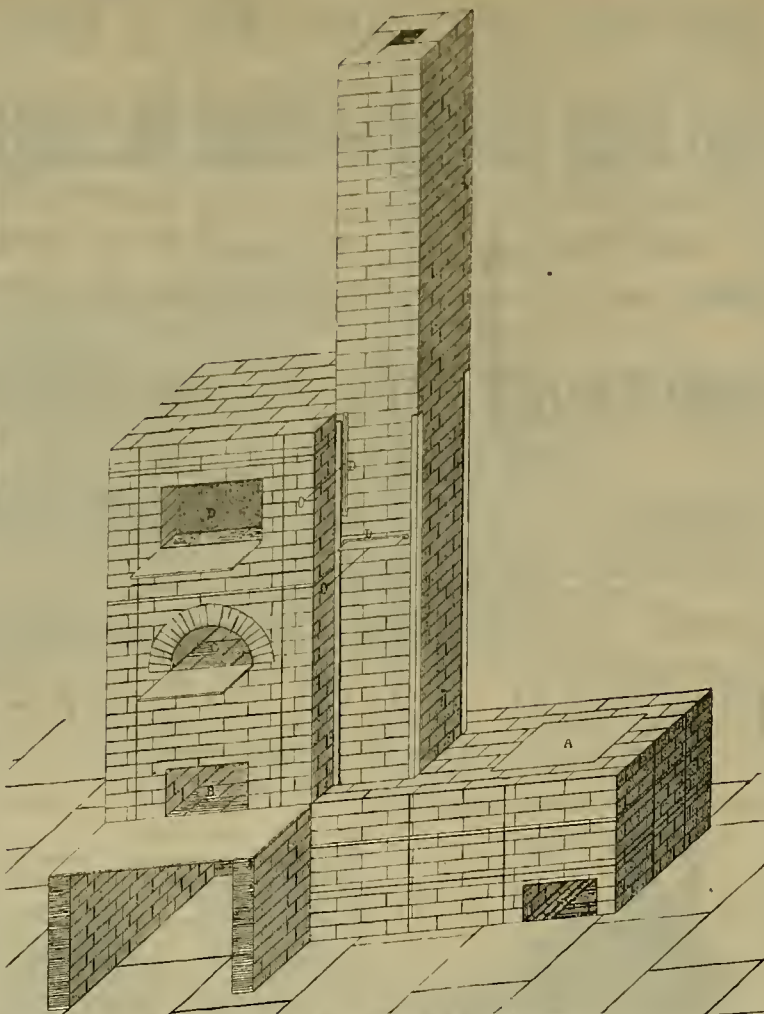
The shaft itself is a cylinder, 6-foot interior diameter, by 11 feet 3 inches high, joined to the frustum of a cone 8 feet deep, contracting to a diameter of 4 feet at the bottom. Along the sides of the cylindrical part of the shaft, opposite each of the fire-places, are placed a series of four peep-holes. These, ordinarily closed gas-tight, are used to determine the height of the ore column and its temperature.

The fire-places and discharges have the details common to well-designed continuous shaft roasting furnaces of this type. The shaft and fire-places are lined with fire-brick; the rest of the furnace is of red brick, with the usual expansion space between.

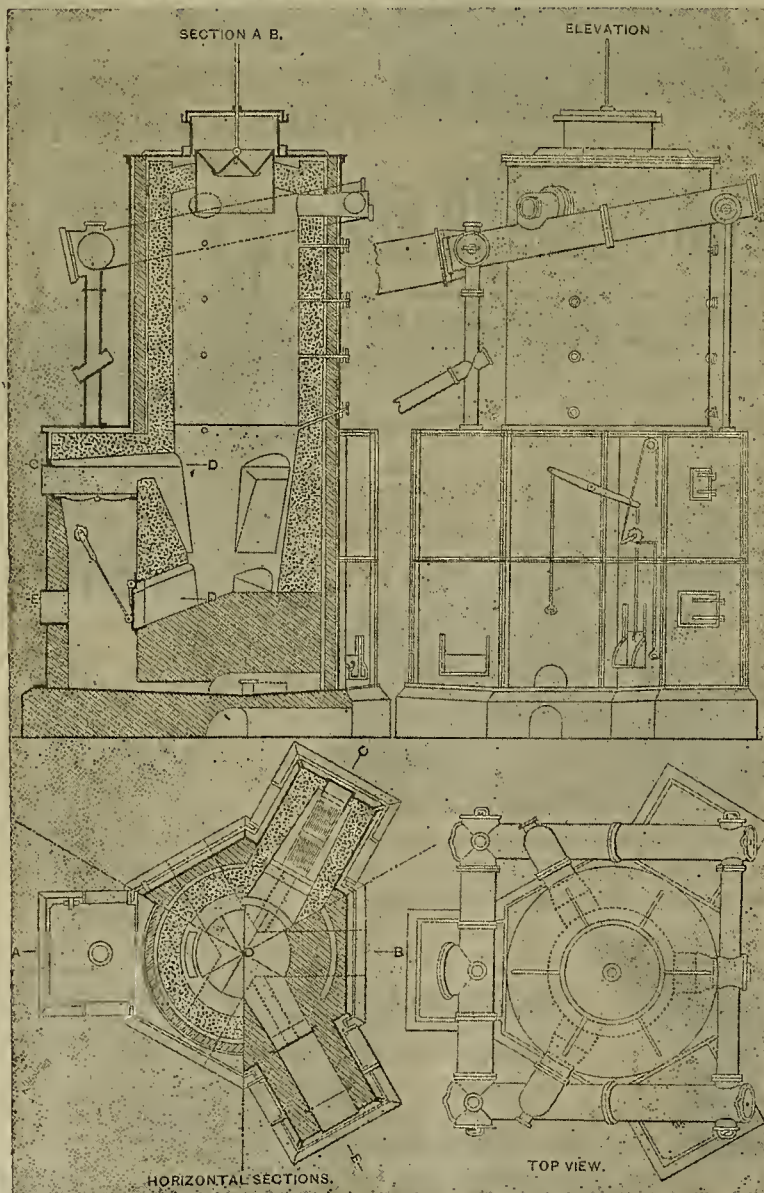
The entire structure rests on a slightly cone-shaped iron plate which crowns the foundation. This causes any quicksilver that might permeate the masonry to flow to the center of the furnace bottom, where provision is made for receiving it. Experience shows, however, that this precaution is hardly necessary, as no metal has ever reached it.

The lower half of the furnace is inclosed by cast-iron plates, bolted and cemented with rust joints. The cylindrical part has a jacket of one-eighth inch sheet iron, and a cast-iron top plate crowns the whole, and makes the furnace vapor-tight.

The charging apparatus consists of a combination of devices used in iron smelting, viz.: the hanging cylinder and conical hopper. But, owing to the value and poisonous nature of quicksilver fumes, an additional cylinder and cover, with water or sand joint, is introduced above the other devices (section *AB*). The red moving the cone passes gas-tight through a stuffing-box in the center of the cover and is attached to a balance-weight. The cover itself is also attached to balance-weights by two chains passing over pulleys. The charging is thus easily effected without exposing the men to the fumes. The cover is lifted; a charge of ore and a little fuel is dumped from the ore-car into the hopper, and the cover is lowered into place. The charge is then allowed to warm in the hopper till it has nearly assumed the temperature of the top. This is done to avoid chilling the fumes and condensing them in the furnace by contact with cold ore. At the proper time, an equal volume of spent ore having been meanwhile drawn below into the ash-pits, the cone is lowered and the charge dropped into the furnace. The small quantity of fumes that



ASSAY FURNACE IN ISOMETRIC PROJECTION.



CONTINUOUS IRON-CLAD SHAFT FURNACE.

escapes into the space between the conical hopper and cover is allowed to cool a few minutes, and the cover is again lifted and a new charge is added to the hopper.

These furnaces were erected under the immediate supervision of Mr. H. J. Hattner. The details of construction are throughout excellent; they work admirably, and although they have been in almost continuous operation for nearly ten years, they have required hardly any repairs.

Assay Furnace.

In Leadville assaying is quite an important branch of the mining and smelting industries. In addition to the assayers attached to all the smelting and sampling works and to the principal mines, there are many independent assayers. Besides being employed as referees and experts in cases of dispute between mines and smelting works, the latter are patronized by prospectors and small miners. The chief assays made in the camp are silver, gold, iron and gangue assays, and at some smelters specific-gravity determinations of slags.

The laboratories are generally provided with permanent crucible and muffles furnaces, made of common brick, lined with fire-brick, and placed side by side, as shown in the cut, but very often the two furnaces are separate.

By means of the dampers *D'* and *D''* in the chimney, the assayer can regulate the draught and intensity of heat in the furnace. The apertures *A*, *B*, *C* and *D* are closed by means of sheet-iron plates, easily removed by tongs. Occasionally, portable clay furnaces of American or English manufacture are used for cupellation.

The Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:

ARIZONA MINES.		Cash.	Debt.
Crocker	.....	\$ 7,467	\$.....
Locomotive	.....	576	.....
Peer	.....	1,199	.....
Peerless	.....	998	.....
Silver King	.....	.....	711
Weldon	.....	2,946	.....
BODIE MINES—CALIFORNIA.			
Bodie Con.	.....	21,512	.....
Bulwer	.....	8,213	.....
Mono	.....	9,394	.....
Standard	.....	2,827	.....
Syndicate	.....	3,334	.....
COMSTOCK MINES—NEVADA.			
Alpha	.....	4,288	.....
Alta	.....	21,244	.....
Andes	.....	2,793	.....
Belcher	.....	21,904	.....
Best & Belcher	.....	12,930	.....
Bullion	.....	.....	2,401
Calcedonia	.....	1,675	.....
Challenge Con.	.....	2,630	.....
Chollar	.....	.....	54,139
Confidence	.....	6,908	.....
Con. Cal. & Virginia	.....	142,159	.....
Con. Imperial	.....	.....	27,218
Con. New York	.....	4,370	.....
Crown Point	.....	3,463	.....
Exchequer	.....	16,941	.....
East Sierra Nevada	.....	812	.....
Gould & Curry	.....	19,599	.....
Hale & Norcross	.....	.....	25,351
Julia	.....	2,358	.....
Justis	.....	.....	12,659
Kentuck	.....	111	.....
Lady Washington	.....	8,877	.....
Mexican	.....	1,498	.....
Occidental	.....	11,312	.....
Ophir	.....	.....	3,804
Overman	.....	24,852	.....
Potosi	.....	.....	29,906
Savage	.....	.....	11,391
Seg. Belcher & Midea	.....	.....	6,759
Scorpion	.....	343	.....
Sierra Nevada	.....	10,198	.....
Silver Hill	.....	5,518	.....
Union Con.	.....	9,058	.....
Utah	.....	4,281	.....
TUSCARORA MINES—NEVADA.			
Belle Isle	.....	.....	16,119
Commonwealth	.....	2,636	.....
Del Monte	.....	.....	3,790
Grand Prize	.....	.....	6,670
Independence	.....	2,092	.....
Nevada Queen	.....	.....	122,125
Nevada	.....	.....	21,989
North Belle Isle	.....	.....	26,754
North Commonwealth	.....	.....	11,718
CANDELARIA MINES—NEVADA.			
Holmes	.....	.....	45,227

- (a) Bullion valued at \$9000 in transit.
 (b) Bullion valued at \$18,750 in transit.
 (c) \$343.73 yet to be collected on Assessment 13.
 (d) Bullion on hand valued at \$14,938 55 Since April 1st bullion valued at \$90,629.96 has been advised, with further shipment to arrive before the close of the fiscal month.
 (e) Cash on hand, \$2,226.
 (f) Royalty due from November, 1890.
 (g) \$56,293 to be collected on Assessment 93.
 (h) Will recommend shipping to the mill about the 15th inst.
 (i) Due from other companies for pumping, \$12,800.
 (j) 5252 ounces unsold bullion (silver) on hand.

GOLD has been discovered at Ny Chow, province of Kwangsi, China, and many Chinese are going from other districts to the new fields. None of the California Chinese miners are reported as having started yet.

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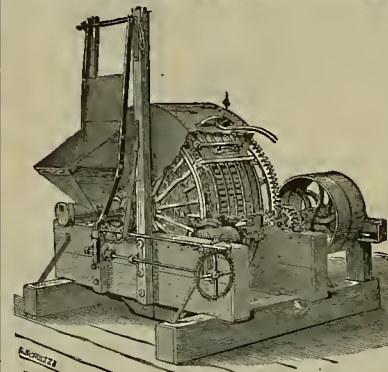
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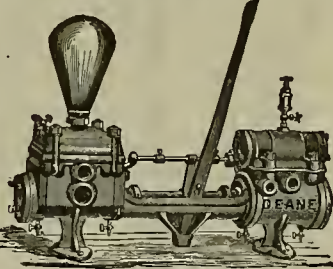
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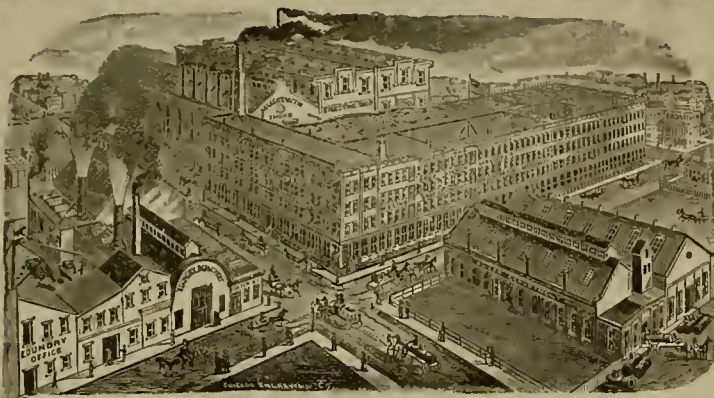
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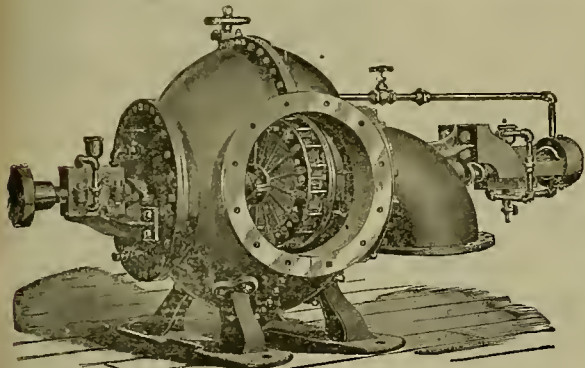
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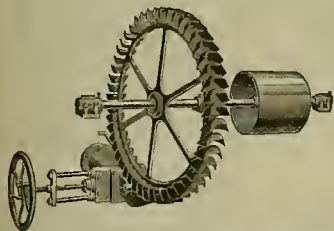
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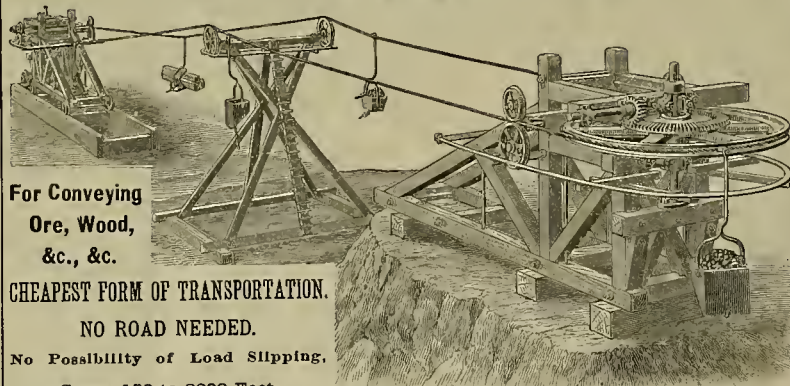
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SAN FRANCISCO, CAL.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, April 9, 1891.

Rains the past week insure good crops, while snow added to deposits on the mountain ranges give assurance of summer water for miners. With these favorable conditions, confidence is growing stronger, trade increasing and money becoming more plentiful. With our unusual large crop of wheat in this State and a higher range of values, the year ought to witness a degree of prosperity seldom if ever before enjoyed.

MEXICAN DOLLARS.—Continued dulness is the characterizing feature of the market. Nominally quoted at 78 to 78½ cts.

QUICKSILVER.—The market is more active. Low prices appear to induce buying. The price ranges lower than for several years. Receipts the past week aggregate 276 flasks.

SILVER.—Purchases by the Department are reported as follows in this month:

Date.	Offered ounces.	Purchased ounces.	Price paid per ounce.
April 3.....	915,000	370,000	\$ 98200 to \$ 98376
April 8.....	—	400,000	\$ 97990 to \$ 98000

Silver continues to hang around with a weak tone reported. To-day (Thursday) the New York market is easy and a shade lower. It would seem that with the Government buying 4,000,000 ounces of silver monthly that the surplus will be reduced soon to such small proportions as to bring about better prices. Possibly political trouble abroad may have a bearing on the silver market, which, if so, will with peaceful arbitration assured, react in favor of the metal. There can be no doubt but the large moneyed interests of the world are opposed to re-monetizing silver, for with it a commodity speculation to much better advantage in many articles of trade is assured.

LIME.—Receipts the past week aggregate 3546 bbls. The market is unchanged.

BORAX.—The market is reported unchanged. Free shipments eastward are still in order.

ANTIMONY.—While we are not able to obtain lower quotations, yet we are assured that purchases are being made slightly lower.

LEAD.—The demand for Alaska has been met. The market here is still unsettled. Our quotations are outside figures. Eastern advices are favorable to the holding interest.

TIN.—The market is reported steady, with canners using quite freely. Some parcels have been shipped to British Columbia. Alaska has taken quite freely. It is very generally conceded that an increased quantity will be used by fruit canners both in this State and Oregon.

COPPER.—The market is steadier. Our advices from the East and also from Europe indicate higher prices later on for outside stocks are being steadily depleted, and when they have gone into consumption consumers will have to secure their wants from holders who ask more money.

IRON.—Imports the past week aggregate 100 tons from New York. The coke strike at the East, foreign labor troubles with more trouble looked for in the United States after this month on the eight hour a day work, have their bearings on the market at the East and abroad and consequently an indirect bearing on our market. The consumption on this coast is not only larger than last year at this time but it appears to be enlarging, yet the stocks here and to arrive are enough to meet our requirements for some time to come. Quotations are nominal.

COAL.—Imports the past week aggregate as follows: Seattle, tons, 3190; Nanaimo, 4127; Departure Bay, 2500; Baltimore, 2600; New Castle, N. S. W. 1765. Total, 14,762 tons. The market continues in buyers' favor. It is claimed by some that a steadier feeling may obtain for spot steam in next month. Large consumers on the other hand say that the market is more apt to set off some more, than to steady itself. Temporary high wheat charters in Australia are against ships offering for this port, but after next month ships will be more numerous.

Eastern Metal Markets.

By Telegraph.

New York, April 9.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday.....	44	93	13 75	4 55	20 35
Friday.....	44 11-16	93	13 75	4 56	20 40
Saturday.....	44	93	13 75	4 56	20 35
Sunday.....	44	93	13 75	4 56	20 30
Tuesday.....	44	93	13 76	4 56	20 30
Wednesday.....	44	93	13 76	4 56	20 30

Quicksilver is demoralized. Tin is steady. Lead in light stock with an increasing demand. Borax is easier. Copper is steadier with a firmer tone. In Philadelphia, the market for pig iron is as follows: Good irons are well taken up, but there is not the slightest disposition to buy for forward delivery, the impression being that the chances are in favor of lower rather than higher price, so, as the coke strike is settled.

Coal and Coke.

SPOT FROM YARD—PER TON.	TO LOAD—PER TON.
Wellington.....	\$10 00 Australian.....
Greta.....	8 60 Liverpool S.F.m.....
Carbon Hill.....	8 00 Scotch Splint.....
Nashua.....	10 00 Cardiff.....
Gilman.....	6 00 Lehigh Lump.....
Seattle.....	7 00 Cumberland bk 13 50@17 00
Coos Bay.....	6 00 Egg, hard.....
Cannel.....	9 50
Egg, hard.....	16 00
Cumberland, in sacks 14 00	
do, bulk.....	13 00
Wagon.....	9 00
Scott Splint.....	9 00 To load.....
Brymbo.....	9 00 Spot, in bulk.....

Coke—English.

The product of the Ontario mine for the first quarter of 1891 was \$146,667.19 from ore sales and 236,469.64 ounces of bitumen. The product of the Daily mine for the same time was \$30,449.55 from ore sales, and \$52,969.58 from sulphides.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MARCH 31, 1891.

- 449,513.—FAUCET—M. Anthony, Berkeley, Cal.
 449,551.—ELECTRO-THERAPEUTIC SYRINGE—E. Bartsch, S. F.
 449,346.—KITCHEN CABINET—Brown & Smith, S. F.
 449,347.—HOOD FOR FIREPLACES—L. E. Clawson, S. F.
 449,208.—STEAM-ENGINE—E. W. Curtis, Portland, Or.
 449,210.—NEWSPAPER COVER—Jos. Davis, S. F.
 449,579.—SHADE ADJUSTER—H. Du Fresno, Portland, Or.
 449,316.—CARD SHUFFLER—E. Falkingham, S. F.
 449,322.—SECTIONAL ROPE SHEAVE—Harris & Thomas, S. F.
 449,445.—FEED MILL—Henry & Wood, Portland, Or.
 449,323.—CONSTRUCTION OF BUILDINGS—P. H. Jackson, S. F.
 449,221.—FARM GATE—L. J. Johnston, Petaluma, Cal.
 449,480.—ENVELOPE MOISTENER—E. E. Kingsley, Portland, Or.
 449,161.—HYDRANT—W. Lacy Jr., Los Angeles, Cal.
 449,292.—ORE CONCENTRATOR—F. B. Morse, Murphys, Cal.
 449,329.—GANG FLOW—J. & W. Patterson, Stockton, Cal.
 449,331.—FLOW—G. W. Phinney, Guerneville, Cal.
 449,338.—SELF-CLOSING GAS-BURNER—W. Ten Eyck, Oakland, Cal.

The following brief list by telegraph, for April 7, will appear more complete on receipt of mail devices:

California—Frank F. Eggers, San Francisco, electrical dental engine; John W. Gibson, San Francisco, dental engine; Albert Graff, San Francisco, piano; Constant Hartin, Willows, device for drawing steam beer; William C. McNeely, Sacramento, riding pad; Alexander Rudolph, San Francisco, window sash; William W. Slater, Oakland, automatic bellringer; William H. Thurman, Fish Camp, connection for wagon trains; Henry Tanker, San Diego, vehicle spring; Charles Vogel, San Francisco, three-rail track for cable railways; Charles Vogel, San Francisco, cable railway crossing; Charles Vogel, San Francisco, curve for cable railways; Henry W. Whitlow, San Francisco, breech-loading gun; Maude Wyman, Oakland, slate attachment; Oregon—J. B. Otto Boeslager, Mount Angel, propeller for vessels; William A. Campbell, Portland, saw guide; James Williams, Portland, rowlock for boats. Washington—Legrand D. Harding, Colfax, grinding mill; William B. Morris, Seattle, stump-puller.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

CARD SHUFFLER.—Edwin Falkingham, S. F. No. 449,316. Dated March 31, 1891. This device for shuffling cards consists of a long narrow case or box having obstructing ribs placed across it at intervals, whereby a portion of the cards may be stopped, allowing those upon the top to slide over and be afterward followed by the others in such a manner as to intimately mix or shuffle them.

HOOD FOR FIREPLACES.—Leonard E. Clawson, S. F. No. 449,347. Dated March 31, 1891. This is a novel attachment which the inventor calls a "hood for fireplaces and grates." It consists of a hollow adjustable casing which is adapted to fit into the upper part of the grate opening. The use of this improves the draft of the chimney and causes the smoke to pass upward more directly, and any eddy or blast which is caused by the wind, and which would tend to throw the smoke outward into the room will cause it to follow the interior curves of the hood or front, and the smoke will thus be again directed into the chimney so as to pass upward and not be allowed to come out into the room.

PLOW.—Geo. W. Phinney, Guerneville, Sonoma Co. No. 449,331. Dated March 31, 1891. This improved construction of plows consists in providing the plow with a jointed beam, a means for turning the beam to one side or the other and maintaining a draft directly upon the point of the plow to whichever side it may be turned.

SECTIONAL ROPE-SHEAVE.—James W. Harris and Thos. J. Thomas, S. F. No. 449,322. Dated March 31, 1891. This invention is specially designed for use in the construction of large pulleys or sheaves of many feet in diameter having a peripheral groove around which wire or other rope is passed either for the purpose of changing its direction or of transmitting motion through the pulley. The rims of these sheaves wear out quite rapidly under the friction caused by the incessant rubbing of the steel wire ropes, which are used in cable railways and for other similar purposes, and in order to readily replace these rims or portions of them and to reduce the expense, these inventors construct the central portion of the wheel with its arms or spider separate from the rim, and the rim in several sections with a means for accurately fitting said sections together and securing them upon the ends of the arms of the wheel, so that when completed a perfect and evenly running wheel will be the result. Any rim-section may be removed, and another one introduced without throwing the rope off the wheel by simply turning the wheel so that the section to be removed lies on the inside and between the two parts of the rope which are tangent to the wheel-rim.

KITCHEN CABINET.—Millard F. Brown and Thos. E. Smith, S. F. No. 449,346. Dated March 31, 1891. The invention relates to a device to be used in kitchens which may be termed a kitchen cabinet. The invention is designed to provide a con-

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ASSESSMENTS.

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Alpha Cons M Co., Nevada.....	6.....25c.	Mar 14, Apr 17, May 7.....	C E Elliott.....	309 Montgomery St
Andes M Co., Nevada.....	37.....30c.	Apr 4, May 8, May 28.....	J W Twigg.....	309 Montgomery St
Atlantic Cons M Co., Nevada.....	7.....25c.	Nov 19, Apr 17, Apr 27.....	D M Kelt.....	330 Pine St
Belcher M Co., Nevada.....	41.....50c.	Feb 17, Mar 24, Apr 13.....	O L Perkins.....	331 Pine St
Best & Belcher M Co., Nevada.....	43.....25c.	Feb 17, Mar 25, Apr 15.....	L Osborn.....	309 Montgomery St
California State Co., California.....	6.....30c.	Feb 2, Mar 16, Apr 20.....	J O Henscom.....	9 Mission St
Carbonado Coal M Co., California.....	1.....10c.	Mar 13, Apr 21, May 7.....	E L Aiken.....	328 Montgomery St
Chollar M Co., Nevada.....	23.....30c.	Apr 6, May 13, June 2.....	C E Elliott.....	309 Montgomery St
Consolidated M Co., Nevada.....	5.....15c.	Apr 3, May 8, May 29.....	C E Elliott.....	309 Montgomery St
Consolidated M Co., Nevada.....	2.....15c.	Feb 12, Mar 31, Apr 23.....	J Wetzel.....	320 Sansome St
Cosmopolitan M Co., Nevada.....	6.....10c.	Feb 24, Apr 7, Apr 29.....	B Burris.....	240 Montgomery St
Crescent M & M Co., California.....	5.....25c.	Feb 20, Apr 6, May 4.....	J H Iham.....	310 Pine St
Crown Point G & S M Co., Nevada.....	54.....50c.	Feb 19, Mar 26, Apr 16.....	J J Lewlands.....	331 Pine St
Crocker M Co., Arizona.....	10.....10c.	Feb 16, Mar 29, Apr 13.....	N T Messer.....	309 Montgomery St
Gray Eagle M Co., California.....	23.....3c.	Apr 3, May 18, June 9.....	A W Barrows.....	303 California St
Guacaran & Cal M Co., Honduras.....	4.....85c.	Mar 14, Apr 15, May 4.....	E Oliver.....	22 Mint Ave
Hale & Norcross M Co., Nevada.....	98.....50c.	Mar 17, Apr 22, May 14.....	A B Thompson.....	309 Montgomery St
Lago Marble Co., California.....	12.....10c.	Mar 30, May 12, May 29.....	W W Lisco.....	322 California St
Kentucky Cons M Co., Nevada.....	1.....20c.	Mar 31, May 5, May 26.....	J W Pew.....	310 Pine St
Lady Washington M Co., Nevada.....	8.....25c.	Mar 3, Apr 7, Apr 28.....	L Osborn.....	309 Montgomery St
Locomotive M Co., Nevada.....	10.....5c.	Mar 17, Apr 21, May 12.....	A H Fish.....	309 Montgomery St
Mexican M Co., Nevada.....	42.....25c.	Mar 9, Apr 14, May 5.....	E Elliott.....	309 Montgomery St
Mine King M Co., Arizona.....	6.....10c.	Mar 23, Apr 25, May 18.....	T F Norman.....	419 California St
N Bloomfield Gravel M Co., California.....	47.....25c.	Mar 26, May 4, May 27.....	H Pichol.....	320 Sansome St
Nevada Queen M Co., Nevada.....	7.....15c.	Mar 4, Apr 10, Apr 30.....	R R Grayson.....	331 Pine St
Northwestern M Co., British Columbia.....	2.....7c.	Mar 9, Apr 9, Apr 27.....	T Bonacina.....	438 California St
Sylvania M Co., Nevada.....	1.....10c.	Mar 2, Apr 18, Apr 28.....	J J Norville.....	4 Sutter St
Valley View M Co., California.....	3.....10c.	Feb 21, Mar 28, Apr 23.....	W S Methair.....	325 Montgomery St
Teresa M Co., Mexico.....	3.....10c.	Mar 28, May 1, May 19.....	A Chemtani.....	328 Montgomery St
Valley View M Co., California.....	1.....2c.	Feb 9, Mar 13, Apr 13.....	W J Gurnett.....	308 Pine St

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Champion M Co., California.....	T Wetzel.....	320 Sansome St.....	Annual.....	Apr 14
Coos Bay Coal Co., Oregon.....	W V Huntington.....	—.....	Annual.....	Apr 15

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Candelaria Cons M Co., New Mexico.....	G Gale.....	309 Montgomery St.....	25.....	Dec 3
Commonwealth M Co., Nevada.....	R R Grayson.....	331 Pine St.....	20.....	Nov 20
Cusumung M Co., Nevada.....	T Wetzel.....	320 Sansome St.....	10.....	Mar 16
North Banner Cons M Co., California.....	T J Mitchell.....	Grass Valley.....	50.....	Apr 20
North Star M Co., California.....	W R Drake.....	401 California St.....	50.....	Apr 20
Pacific Coast Borax Co., California.....	A H Clough.....	230 Montgomery St.....	1 00.....	Apr 10

veoient rotary adjustable cabinet with receptacles for various articles in common use in the kitchen and attachments for implements for the same purpose, and in connection therewith of an adjustable stand or table. The whole device forms an exceedingly convenient combination of receptacles and mechanical devices in one apparatus.

Mining Share Market.

Mining shares the past week gave unmistakable evidence how the few remaining outside dealers in stocks are at the mercy of manipulators. For three or four years, soon after Col. J. W. Mackay arrived from the East, the market went down and kept down until about the time he left for the Atlantic Coast. So accustomed is the public to this, when it was positively known that the Colonel was in this city a scare appeared to possess traders, and under this, selling prices gave way, causing a decline in three boards of from 15 to 25 per cent. Of course all stocks sold were absorbed by the two or three pools, which while seemingly operating against each other take good care to pull together. The decline which came the writer intimated when advising in last week's PRESS buying for cash. Everything now warrants the correctness of the writer's statement that a good profit will be made before 30 days by those who bought, even higher than the lowest prices that obtained last week. This opinion is grounded upon the general bear feeling among outside dealers, and where there is so much bear talk there is not much buying except by inside pools. The latter having large lines of stocks to sell and more assessments to levy and collect, must send prices up to draw in outside buyers. Con. Virginia's steadily increasing battery assays only help the bonanza stocks, and unless the entire line moves buyers are fearful. To move the line successfully more ore and higher assays must be made in other parts of the lode. It now looks as if Overman and Chollar will be made to do service in this direction, but if these two fail to draw in buyers at higher prices the other mines will come to the front. The great trouble now is that the Gold Hill and Middle mines are in poor repute. The prevailing opinion is that they have been, are being and will be looted for the benefit of a limited few, causing many to believe that to buy shares of those mines is to take to your breast a viper that kills financially. With such an odorous reputation it is hard for the managers to make very much of a deal. Assessments it is claimed by well informed parties will have to be levied right and left before 45 days pass.

Speaking of quite a general belief that the middle and gold Hill mines have been and are being looted, it is in place to state what came under the writer's observation regarding Yellow Jacket. In looking over files of the *Alta California* covering the Con. Virginia District in 1875-6 it was noticed that that paper as far back as then, openly charged that the Yellow Jacket mine was being looted. At a later date it appears that the Bonanza people secured control of the mine when dividends were in order. At the time they lost control, a dividend had been declared but under the new management it was rescinded, and it was not long thereafter before the reserve fund disappeared and an assessment levied, which was followed by other assessments. This was done too, while taking out and milling ore said to be of the same grade that the Bonanza firm had made the mine pay dividends. Hon. Francis G. Newlands' attention being called to the common talk that the mine was being looted instituted inquiries which resulted in higher battery assays. These assays nearly ever since Mr. Newlands went East, have been singularly uniform—\$18 a ton, which causes a large number of experienced miners to believe that there is something radically wrong, and as the gentleman is now or will be within a few days on this coast, it is not at all unlikely but his attention will be "drawn to the singularity of the assays—something never before known in mining.

The Con. Virginia Mining Co. boasts of possessing a Fish that knows all about what is being done in the mines. Owing to the value of this Fish the company has fitted up a fine office room. News from the Constocks report that Con. Imperial is shipping ore for milling. Overman is taking out higher grade ore, and consequently the weekly assays should show an increase. More ore is being milled by the company. Yellow Jacket is taking out ore which, if reports be correct, should mill over \$30 a ton in gold, but whether the company will return that or even \$20 a ton is by many a disputed

point. Crown point, Challenge and Confidence can take out, so it is said, good to rich ore whenever desired. Work in these mines and as for that several others may be of a delay character so as to freeze out outside stockholders. In the middle and north end mines, no ows is received different from that published last week, all still belong of a very encouraging character. If the public had confidence in the management of the mines on the lode, stocks would be selling at quite high figures. "The burnt child dreads the fire."

From outside mines the tenor of advices continue as heretofore reported. It looks as if the showing of ore from two of the districts will soon be of a more pronounced character.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 19.	WEEK ENDING Mar. 26.	WEEK ENDING Apr. 2.	WEEK ENDING Apr. 9.				
Alpha.....	1.00	1.20	.90	1.16	1.00	1.20	.89	1.10
Alta.....	.75	2.00	.85	.95	1.25	1.05	1.25	1.05
Andes.....	1.00	2.00	1.00	1.25	1.00	1.25	1.00	1.25
Belcher.....	7.00	2.00	6.25	3.00	6.25	3.20	2.50	2.50
Best & Belcher.....	4.60	8.25	5.00	8.06	7.68	8.00	7.50	7.25
Bullion.....	2.35	2.80	1.95	2.50	1.95	2.30	1.90	2.25
Bodie Cons.....	1.05	1.55	1.20	1.50	1.15	1.45	1.25	1.40
Chollar.....	.40	.55	.40	.55	.45	.40	.45	.40
Commonwealth.....	.75	.80	.85	1.05	.75	.80	.85	.85
Con. Va. & Cal.....	9.87	13.62	10.87	13.75	11.62	13.37	11.00	12.76
Challenge.....	2.45	3.20	2.35	3.10	2.40	3.00	1.95	2.50
Chollar.....	2.40	3.43	2.85	3.30	2.65	3.02	3.10	3.15
Confidence.....	6.32	6.50	6.00	6.25	7.00	6.75	6.50	6.50
Con. Imperial.....	.20	.30	.20	.30	.20	.25	.20	.25
Caledonia.....	.70	.80	.80	.75	.75	1.20	.70	.95
Crown Point.....	1.70	2.35	2.00	2.65	2.60	3.10	2.30	2.75
Crocker.....	.65	.15	.20	.25	.25	.....	.....	.....
Del Norte.....	.20	.20	.20	.20	.20	.20	.20	.20
Eureka Cons.....	3.00	3.75	3.50	.....	3.50	.....	3.75	3.85
Exchequer.....	.80	1.05	.75	1.06	.81	.95	.70	.85
Grand Prize.....	.15	.20	.20	.25	.15	.20	.....	.....
Gold & Oury.....	2.75	4.10	3.05	3.75	3.15	3.70	.95	3.45
Hale & Norcross.....	2.15	2.60	2.15	2.60	2.15	2.60	2.15	2.25
Julia.....	.20	.30	.20	.30	.20	.25	.....	.....
Justice.....	1.00	1.45	1.20	1.35	1.10	1.50	1.10	1.40
Kentuck.....	.40	.55	.45	.55	.40	.55	.30	.40
Lady Wash.....	.15	.20	.15	.20	.15	.20	.20	.45
Mono.....	.50	.75	.75	.55	.65	.65	.65	.65
Mexican.....	3.00	4.55	4.34	4.50	3.75	4.20	3.50	4.05
Navajo.....	.20	.40	.35	.40	.30	.30	.....	.....
North Belle Isle.....	.65	.85	.90	1.25	.90	1.00	.85	.90
New Queen.....	.20	.20	.20	.20	.20	.20	.20	.20
Occidental.....	1.15	1.60	1.45	1.20	1.35	1.10	1.35	1.35
Ophir.....	4.55	6.85	2.25	6.25	6.25	6.00	6.25	6.25
Overman.....	2.75	3.75	3.00	3.95	6.12	3.76	4.20	4.20
Potosi.....	5.37	6.04	2.00	5.87	3.75	4.53	7.00	4.30
Peerless.....	.10	.20	.15	.20	.15	.20	.15	.....
Piedmont.....	.15	.15	.15	.15	.15	.15	.15	.15
Savage.....	2.30	3.45	2.75	3.35	2.80	3.20	2.45	2.95
S. B. & M.....	1.05	1.65	1.20	1.60	1.50	1.85	1.20	1.60
Sierra Nevada.....	2.55	3.40	3.10	3.50	3.30	3.70	3.10	3.50
Silver Hill.....	.20	.25	.30	.30	.20	.25	.30	.30
Scorpion.....	.20	.35	.35	.40	.35	.40	.35	.35
Union Cons.....	2.70	3.55	3.40	4.20	3.90	4.20	4.35	4.10
Utah.....	.80	1.30	1.10	1.40	1.15	1.30	.95	1.20
Yellow Jacket.....	2.50	3.40	2.60	3.40	2.85	3.35	2.65	3.15

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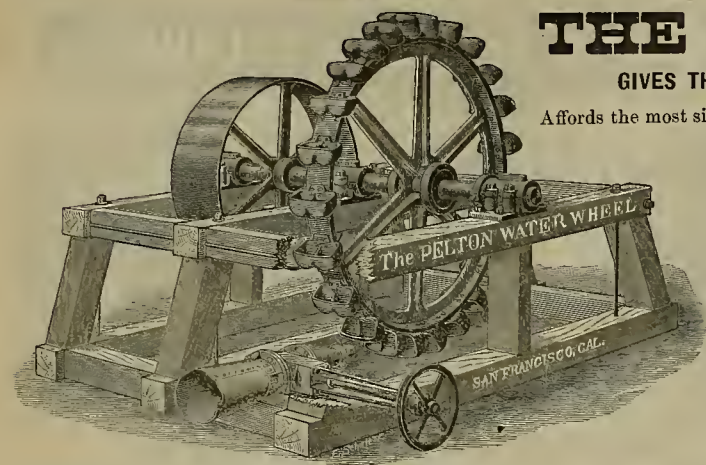
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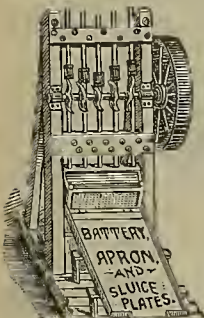
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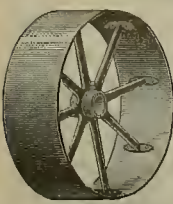
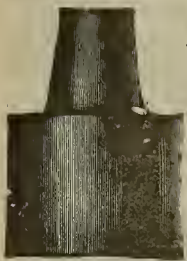
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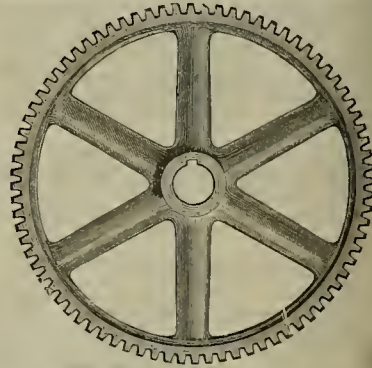
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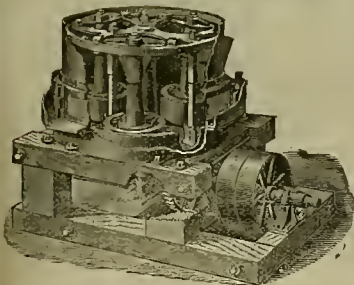
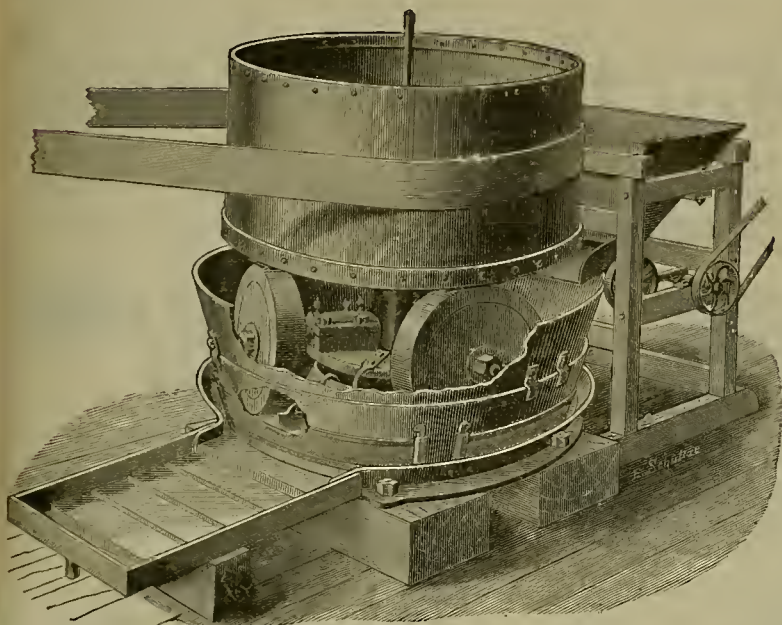
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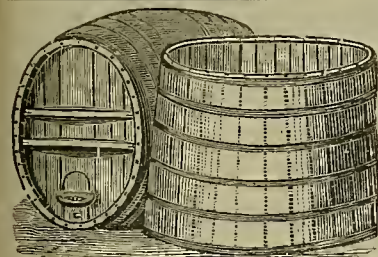
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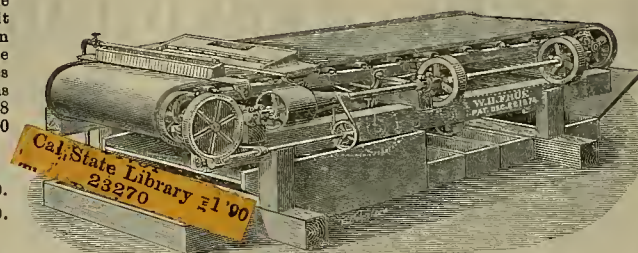
COAL MINES OF THE WESTERN COAST.
A few copies of this work, the only one ever published
treating of Pacific Coast Coal Mining, have been ob-
tained, and are for sale at this office for \$2.50 per copy.
It was written by W. A. Goodyear, Mining and Civil
Engineer, formerly of the California State Geological
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N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., Room 15, No. 132 Market Street, San Francisco, Cal.

Joshua Hendy Machine Works,

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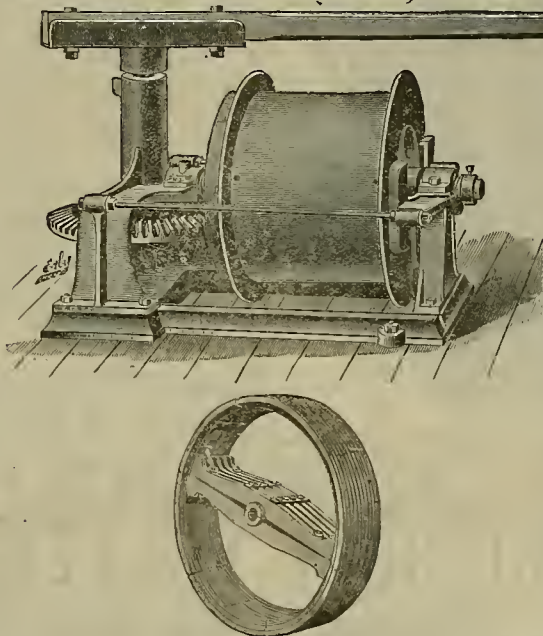
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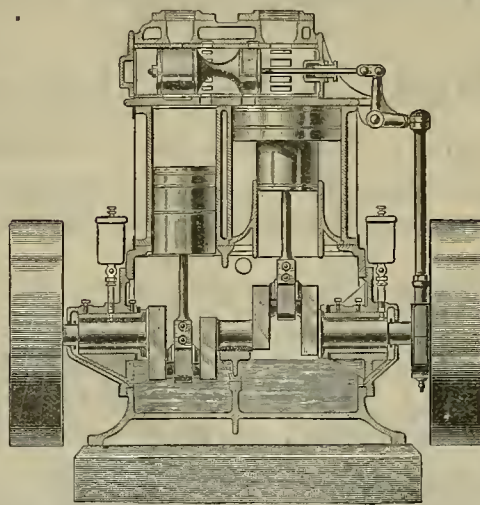
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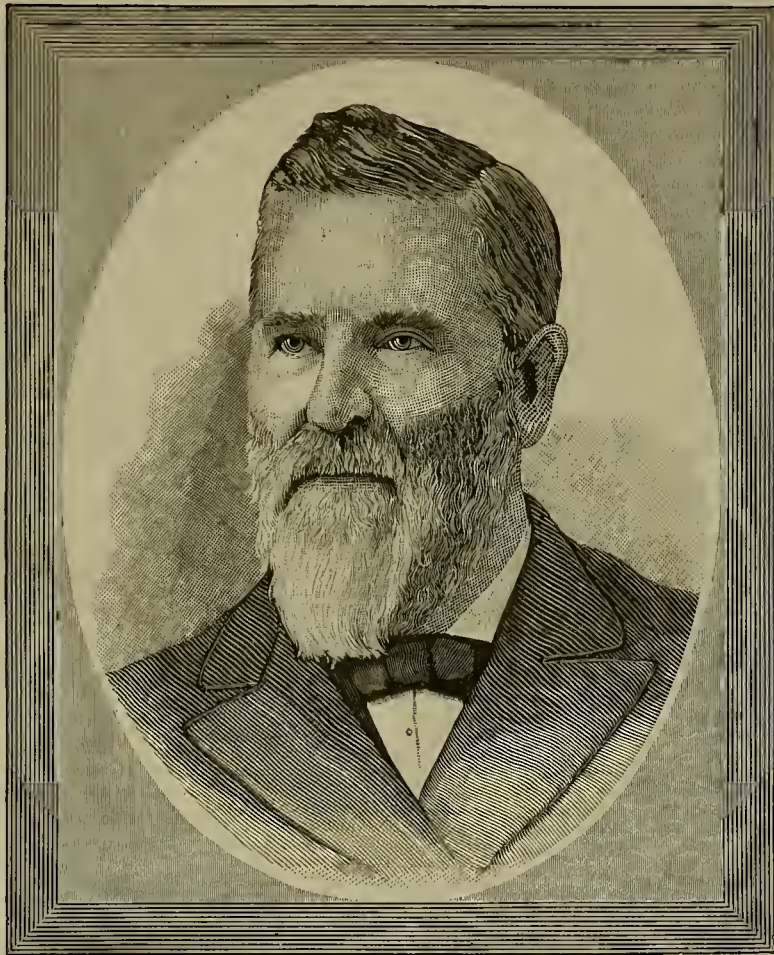
VOL. LXII.—Number 16. DEWEY & CO., PUBLISHERS. SAN FRANCISCO, SATURDAY, APRIL 18, 1891. Three Dollars per Annum. SINGLE COPIES, 10 CENTS.

The Late Governor Waterman.

By the death of ex-Governor R. W. Waterman, California loses one of her most prominent miners and foremost citizens. He came here with the early tide of the gold-seeking immigration and engaged in mining on the Feather river for two years. Returning East, he remained until 1873, when he again came to California to make his home in San Bernardino county. He immediately identified himself with the mining industry, in which he has since continued, making a large fortune by legitimate mining investment and development. With his partner, J. L. Porter, he took the leading part in opening the famous Calloo mines, the heaviest silver-producing district in California. It was here that he laid the foundation of his fortune, since accumulated not by "stock deals," but by honest mining work. Some years since, he purchased the Stonewall gold mine, on the Cuyamaca grant, San Diego county, a few miles from Julian. The mine had been abandoned some years, and by many was supposed to be worked out. Governor Waterman properly opened it, equipped it with a fine plant of machinery, and it was developed into a splendid paying mine. He told the writer, about two years ago, that it was paying him \$20,000 a month. He was naturally a large employer of labor, and invested his money in directions which developed the natural resources of the State. The portrait on this page is from a photograph made about two years since.

It is stated that Governor Waterman's fortune is about \$8,000,000, and not long since it was asserted that his increase from his mining property was \$1000 per day. He owned considerable ranch property in the Southern counties, and was interested in some local railroads as well.

The disease which caused his death was pneumonia, and it did its fatal work with irksome speed. He was hurried at San Diego with marked honors, on the afternoon of April 14th. Governor Waterman was a native of Herkimer county, N. Y., and a California pioneer. His chief field was mining and in it he



THE LATE ROBERT W. WATERMAN.

achieved great success and amassed a large fortune. He was elected Lieutenant Governor in 1886, and became Governor upon the death of Governor Bartlett in 1887. Probably no man ever labored harder to administer an office in accordance with his idea of right than did Gov-

ernor Waterman. He suffered from inexperience in public affairs, and made mistakes, but of his sincerity and uprightness there is no question. It is sad that after such an experience as he had in a high office, he was not given more time to enjoy the quiet of private life, of his fortune, and of the family ties which had such grateful influence upon him. He was but 65 years of age, and apparently rugged and good for many more years of earthly effort and attainment, but the summons came and was not to be deferred. His memory will be long cherished.

WHERE ARE THE TRUSTEES?—The Arnold Gold and Silver Mining Co. of Arizona was organized in this city in 1886, mainly with Eastern capital, and died a natural death in 1888, there not being any one where they had the mine. The company had a fine lot of machinery, having paid cash for the mill to the Union Iron Works, and bought the hoisting works on credit. When the company failed, the Georgine Mining Co. bought their hoisting outfit for \$25,000, but, strange to say, there was nobody left in the company to whom this money could be paid. A number of people have claimed it, but it must be paid to an officer or trustee of the original company, and none of these have been found. In two years the Georgine Co. have been unable to find the legal owners of the \$25,000, which is in the hands of Mr. J. Snutherland, now at the Palace hotel, in this city. The courts will probably settle the question of ownership.

DR. JORDAN, the newly elected President of the Leland Stanford Jr. University at Palo Alto, is now engaged in selecting the faculty. Leading specialists and men of high reputation will be secured from various American colleges and educators from across the ocean will be asked to fill the remaining vacancies.

REPORTS of mineral discoveries in South Dakota, and also the Cherokee Strip, are published, and some excitement prevails. The Cherokee Strip claims are gold quartz, and those in Hayward district, South Pennington Co., S. D., are silver-lead.

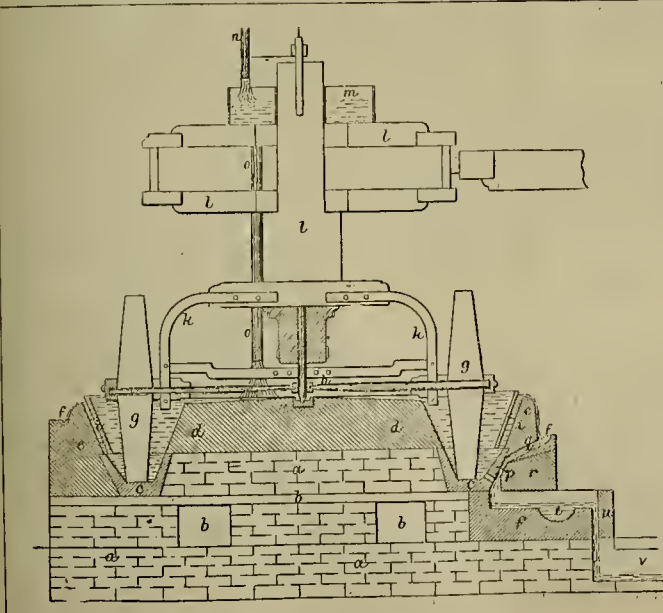


Fig. 27—BARON DE CASTEL'S AMALGAMATOR.

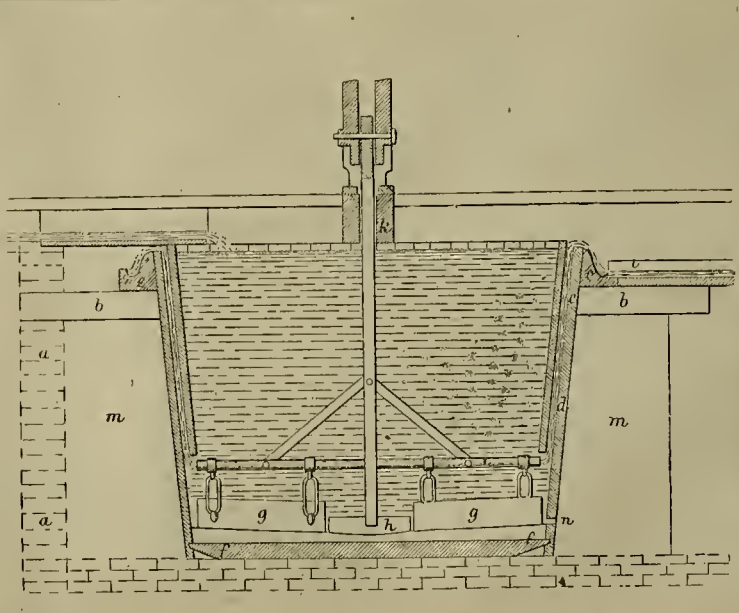


Fig. 28—AN ANCIENT AMALGAMATING MACHINE.—See page 249.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

The Placers of Sonora, Mexico.

NUMBER II.

EDITORS PRESS:—Herewith please find two pen and ink sketches of the placers of Los Llanos and Cienega, the deposits of gold being indicated in a general way by dotted circles in the cuts shown on page 249. The originals were made on the ground by the writer in 1873; and may in a rough way, provided your space will permit publication, assist the general reader to a clearer estimate of the topography and size of the placers. From our survey, made with a view to obtaining a grant from the Federal Government of Mexico, we found that about 63 square miles would be required to cover the grounds of Los Llanos alone; and of this again, we estimated that some 30 square miles could be made available by the use of a complete hydraulic plant; such as can be seen in some parts of our own State to-day.

The natural fall of the ground of Los Llanos toward the valley of the Arltuavriver is fully two per cent over 100 feet to the mile, and in some parts much more. As there is little or no gravel to contend with, the dirt being finely disintegrated granite, slate, limestone, and quartz intermixed with a clayey loam, we anticipated but little difficulty in sweeping off the sands into the valley below, provided always that an ample supply of water could be obtained, and the use of various gulches as ground sluices, whose fall in some cases was much greater than have mentioned. Naturally, as is the custom of the California miner, we prospected the range of mountains at the head of this placer for the source of the gold; but with but little success, except as to the quartz mine known as La Mina de Salazar. Nature in her workings in ages past had covered up all traces of quartz-ledge, pockets, and auriferous slates from the pick and hammer of the surface prospector. The quartz mine spoken of, is traceable along the head of the placer for over a mile, and has been worked to a depth of about 200 feet by a main shaft and well prospected in other portions of its length. From history and tradition, as well as such samples of the ore as we could obtain, we did not feel tempted to pump out a mine the average yield of which did not exceed \$25 per ton.

The topography of this placer, as well as that of Cienega, is much like, in appearance, the "hog-wallows" met with on the plains of San Joaquin valley, except that they are on a much grander scale, with shallow and deep pits alternating in every direction with little and big mounds of earth, turned up by the industrious miners. Many of these pits and mounds are covered with grass, while the hummocks often support trees generally of the *Mesquit* and *Palo verde* varieties, whose growth must have commenced in the early part of this century.

From the great scarcity of water at Los Llanos, we resolved to camp and make headquarters at Cienega, where the little lake in the center of the deserted and fallen city gave us an ample supply for man and beast, as well as the means of making tests of the value of the grounds, by the use of water.

In our survey of Cienega we took an extent of ground about equal to that of Los Llanos, estimating the workable grounds at about 30 square miles.

The natural facilities for hydraulic workings of the Cienega placers are very good indeed, the greater part of the grounds being located on plateaus some hundreds of feet above the town site, and connecting with the valley below, by, in many cases, precipitous gulches.

In a general way our prospects, at first at Cienega, were made in a manner similar to those at Los Llanos and with about the same results.

In any event our work here resulted in the formation of the Cienega Placer Mining Co. in San Francisco, Cal., with the shipping from that city of such machinery and material as would enable us to test the value of the placers in a practical manner. Our first effort in this way, was to turn a small kiln of lime and sink a curved well in the quicksands of the Arroyo Grande, which swept around the northern line or foot of the placers from the mountain range on the south, the Arroyo, trending northwest and then south west into the plains. The curved well was laid in mortar, with stone, was circular in form and six feet in diameter. This we started on a circular form or base of plank, using, of course, only the rim, one foot wide, making the well from out to out, eight feet in diameter. We laid up the wall on the plank form and commenced shovelling the sand from the center, the curb sinking slowly as fast as the excavation was made, and perfectly protecting the workman from any but a gradual flow of sand at the bottom of the well and from without. The stone curb was being continually added to from above, until its weight became such that it was not a question of safety, sinking in quicksand, but one of keeping the curb from sinking too fast, and forcing the loose running sands up through its center, and delay the men in their work. The well was put down through the sand in this manner for 32 feet, when bedrock was reached, a conglomerate formation, and with a flow of four to five miners' inches of water. Having a steam boiler on the surface, and locating a Knowles No. 10 steam

pump near the well in an adjoining excavation, and some 20 feet below the top of the ground, it was an easy matter to connect a suction pipe with the bottom of the well and keep it free from the flowing water. In this way we got down about 40 feet, and having found no gold at surface of bedrock, or in the rapidly hardening conglomerate, we stopped sinking and devoted our attention to raising the water from the well, through a seven-inch pipe line in a string of sluices we had put up on the placers, about 50 feet above us and some 800 feet away.

Our sluices were laid in the regular way, with not so much fall, perhaps, as used in California, as we had no gravel to contend with. They were well provided with riffles and quicksilver, and with fully 12 to 15 miners' inches of water, pumped up from the well at the arroyo, we commenced the practical prospecting of the placers of Los Llanos and La Cienega.

Employing several teams to haul the dirt and sands from many different parts of the grounds for testing, we weighed off the dirt into tons of 2000 pounds, putting it through the line of sluices in lots of 5, 10 and 20 tons and cleaning up each lot separately. In this manner we must have made 100 tests, in every case meeting with returns that would be considered a bonanza by the hydraulic miners of California. Our returns averaged 10 cents per ton of 2000 pounds, or about 20 cents per cubic yard. The sand that had been worked over and over by the Mexicans and Indians by dry methods was the only material we tested, as we had become educated by experience to believe that it would be singular ground containing gold, that would escape the hawk eyes and expert hands of a Mexican or Yegui Indian. Again, much of the dirt put through the sluice line came out in small undissolved lumps, and which, after a good soaking in water, we found would yield gold in about the proportions given above.

The gold extracted was worth \$19 per ounce, and was generally of a granular and ragged character, there being, as far as I know, no flour gold found in the districts.

It will be seen that there are some wonderful possibilities in working these placers in a large way, and that there are nearly one hundred million dollars in gold in the grounds, allowing 60 square miles as the extent of the two placers and the dirt and sands to be five yards deep and the value per yard to be ten cents.

These figures were of interest enough to cause a diligent search for a water supply, which was found about 30 miles away, near the city of Altar, in the Altar river. Probably 2000 miners' inches could be obtained from this source, and by piping, give a head at the highest ground on the placers of 300 or 400 feet. As for labor and living supplies, they are cheap and abundant, with a climate much like that of our own State, although somewhat different in time and term of rainy seasons. The rains occur there twice a year. Two to three months of what is known as our midwinter, and about two months in midsummer. During these periods, it is quite a deprivation to the dry washers, the damp sands and earths making the use of the machines impossible. Yet again it has this advantage, that the rains readily dissolve the lumps not previously powdered by working, rendering a rewashing of the grounds, when dried by winds and sun, perfectly practicable and profitable.

In regard to the Mexicans themselves, I can cheerfully testify to their almost universal generosity and hospitality, that needs but a courteous return, to make them everlasting friends. The millions or so of dollars required to place the placers in bonanza, together with the uncertainty of our obtaining exclusive title and possession of these valuable mineral lands, forced us to reluctantly abandon the enterprise.

CHARLES MARION TYLER, M. & M. E.
April 9th 1891

The Newton Copper Mine, Amador Co

[From our Travelling Correspondent.]

EDITORS PRESS:—The Newton is in charge of Mr. J. A. Ferson, who is well known as the Superintendent that took the Union copper mine of Oalaveras county, when it was but a shaft full of water, and carried it through to an average yield of 100 tons of ore per day, and is now the most complete copper plant on the coast.

In this connection I wish to correct an error in a former article by myself on the Oxford Copper Smelter at Copperopolis, where I am made to say that the capacity of the Smelter is 10 tons a day. It should have been 10 tons to a charge or about 100 tons a day. But to return to the Newton. [The main shaft on the Newton is down 433 feet, with drifts run north 385 feet.

The vein averages four feet. On the lower level the ore carries 14 per cent of copper; the other levels carry from 7 to 30 per cent of copper.

All this time there is 11,000 tons of roasted ore in process of leaching and 5000 tons of raw ore on the dump. The mine is equipped with all the necessary buildings; and a complete hoist to go 1000 feet in depth.

The property covers 93 acres—U. S. Patent—which gives 2000 feet on the vein.

There have been expended on the mine over \$100,000. Of the ore on the dumps 4000 tons can be smelted and he made to yield \$60,000 clear of all expenses. About \$25,000 would

carry the mine through to a daily net income of \$300. The plant may be sold to be idle outside of leaching. Considering the value of ore on dumps, the size of vein, per cent of copper and the very small price asked for the mine, I know of nothing that promises as large returns for amount invested.

E. H. SCHAEFFLE.

Smartsville, Yuba County.

[From our Travelling Correspondent.]

EDITORS PRESS:—Smartsville's past record as a gold producer may not be again equaled unless the restrictions on hydraulic mining be removed, but a much larger percent of the gold extracted will be saved by the present methods of working, and the field left for a generation. The old channels are deep and the gravel banks immense, with the gold distributed throughout the entire body. With the hydraulic the entire body will pay handsomely; but to conform to the present conditions, it is not possible to work to a profit more than a few feet of gravel next to the bedrock. This is drifted, crushed, and then ground in an arrastra to polish the gold and remove the film that prevents the golds amalgamating. After grinding, the contents of the arrastras they are discharged and the gold caught in sluices. In all gravel or cement deposits, there is a large percent of waste which is usually crushed.

The Snodgrass Patent is a step in that direction of better results, but there is still room for further improvement. Two methods suggest themselves: First to employ pickers like the slate pickers in the coal mines, to pick out the waste boulders as it moves down over the screen; or second, and perhaps better, to have the cement feed into a revolving drum, like the Snodgrass, and discharge on to a grizzly. The revolving drum would loosen the cement from the cobbles and the grizzly separate it, so that the cobble would all be discharged by itself and the gold-bearing cement alone, to be fed into the battery or arrastra, and thus by concentrating the material increase the capacity of the plant ten fold, and lessen the cost of operating correspondingly. It is a question which is the best method of amalgamating this class of gold.

At Forest Hill, on the May Flower, the pulp, after it leaves the battery, flows over a series of polishing bars and it is claimed that the results are very satisfactory. Here at Smartsville the arrastra is used. If the cobble was all removed, the material thus concentrated run through double discharge batteries, and the pulp from the batteries allowed to flow into a system of continuous feed arrastras with plates at the discharge of the lower arrastra, the whole operation could be made automatic, the product handled very rapidly, and about all the gold contents of the cement saved. At this time the principal work at Smartsville is confined to the Excelsior and Blue Point properties.

The Excelsior W. and M. Co.'s property, W. S. Stewart superintendent, is locally known as the Ayer mine and it is situated on the Pioscene Yuba channel at Mooney's Flat, two miles northeast of Smartsville. This channel is here 75 feet in width and is opened and operated by a 75-foot shaft, with gangways driven 300 feet on the channel. About ten feet of the cement, next to the bedrock, is mined. This gives an average of \$3 a ton by arrastra process. The mine's output at the present time is 40 tons a day.

The Blue Point mine, H. B. Wheaton lessee, is opened by an incline shaft, the channel being about 50 feet below the mouth of the shaft, which is run from the bottom of the old face secured in hydraulic times. Sixteen feet of the cement gravel next to the bedrock is worked, and yields from \$2.50 to \$3 a ton. About 70 tons of cement is worked each day. The cement is broken up, run through a rock-breaker, and then fed into arrastras, where it is given just sufficient water to bring it to the consistency of a pudding, when it is thoroughly ground and discharged through a side-gate into a set of sluices. The present operations are profitable, but when contrasted with "the days of old, the days of gold, the days of '49," when the hydraulics brought down the bank and liberated the gold from thousands of tons of gravel each day, it is like trying to accumulate a million by saving a penny each day. The gold is here, millions of it. Just how long it must lie here, benefiting no one, is a question for our engineers to solve by providing a way that will again permit the use of the hydraulic.

E. H. SCHAEFFLE.

White Oak District, N. M.

EDITORS PRESS:—The mines of the White Oak district are now in a very prosperous condition. In my last letter, I spoke of the new discovery on the Old Ahe property, made by Wm. Watson, one of the owners. At that time, I could only speak of the new prospect as it appeared at a depth of a little more than 35 feet, and of the results of the first mill-run of 46 tons, which cleaned up \$33.50 per ton. Now the working shaft is down over 200 feet, with six levels open, and the ore body developed over 200 feet along the lode. The width varies from 30 inches to 11 feet, and the grade of ore has so increased with depth that the average mill "clean ups" have been over \$50 per ton.

For two months or more, in fact up to March

1st, the owners ran the old ten-stamp mill east of town. The mill was always of very small capacity for its size and is nearly worn out. While using that mill, they could only get through from eight to ten tons in 24 hours. Since March 1st, they have been running the North Homestake mill, that mine being for the present idle. They manage to get through 20 tons per day. The owners will bring in and erect a fine mill of their own the present year, intending to have it in full operation by the end of September. Mr. Watson, who is the mining man of the parties interested, and managing owner, will visit California this spring to inspect recently erected gold mills there, with a view to the adoption of every recent meritorious device which tends to increase efficiency or reduce expense. When he goes to the coast, I shall take the liberty of asking for him your good offices, in the way of facilitating the objects of his visit.

Mr. Dye the managing owner of the Lady Godiva has been steadily employed in developing his fine property, adjoining the Old Ahe northwardly. In this mine, there are two veins, the Lady Godiva in the working shaft, and the No. 1, 50 feet west of that. Levels have been run on both at the 450 level, and stops opened on the No. 1. These veins while pocket yield ore of a very high grade. Dye is sinking a winze from the 450 level on No. 1, and will sink the working shaft at once. Other property adjoining, chiefly owned by Mr. Dye, has been long in litigation. All of that which affects the working of the property, has been settled favorably to Mr. Dye's interests, and such being the case, extensive workings upon ore bodies of known value, in that property, will shortly be commenced.

The South Homestake is working a considerable force of men, and is dumping ore of good grade. The North Homestake is idle, the owner being engaged in exploiting and equipping another mine in California, and not being able to give this his attention. The stoppage will, however, be temporary. This great property has a good many thousands of tons of good grade ore blocked out ready for stoping, and it is safe to say that it will not remain idle a day longer than the owner can arrange his affairs so that he can give it his attention.

We may then look for a prosperous mining year in our chief mining district, and may confidently expect our production of the yellow metal to be in 1891, about three what it has hitherto been.

I will from time to time report prospects and it is in the air, that I may be able to chronicle the development of yet new mines in that old district. In the other mining district of this county, but little is now doing. The Parsons mine in the Bonita district is idle. On the death of the discoverer, a sole owner, it fell into the hands of his heirs, none of whom knew anything of mining, or of the mining regions. The management has not been of the best, and the property is understood to be so far entangled, that it may remain idle a long time. With the chief property in the district in this condition, a cloud has fallen on the camp.

Lincoln, N. M., April 7, 1891.

Daily Weather Maps from the Signal Service.

EDITORS PRESS:—The inclosed map is a copy of the first issue of the new daily weather map which will be published regularly at this office.

For the present the maps will be published from the morning reports, at about 10 A. M. If it is found necessary and advantageous to public interests, a second daily map will be published from the evening reports, about 7 P. M. These maps are intended for free distribution to commercial associations, educational institutions, public libraries and individuals. The edition will be limited in order to avoid unnecessary expense. Requests for the map should be addressed to the undersigned and give particular reasons for receiving the publication. The necessity for such a requirement is evident, as the maps must be furnished to those who need them most and can make the best practical use of them. There are two important uses to which the daily weather map can be applied.

1st. To obtain information as to the daily forecasts of weather and temperature for the Pacific Coast States. In this case it is necessary that the map should reach its destination sufficiently early to make the forecasts available within the period for which they are made. It is evident that the use of the map in this respect will be quite limited, owing to the want of sufficient railway facilities for distribution by mail from San Francisco.

2d. To study the weather conditions of the Pacific Coast States from the standpoint of synchronous observations. The daily weather map is practically a photograph of certain atmospheric conditions prevailing over the region represented by the map. It affords the very important advantage of studying the weather of a place in the light of extensive surrounding conditions that influence it. By such investigation, the reader of the daily weather map becomes able to prognosticate from the local conditions at his station, and to have a better understanding of the general forecasts issued from the central office. In this case the weather map can be kept in permanent file for future reference to great advantage. Any particular storm or change in weather conditions can be studied at leisure. This new publication has been inaugurated to give the people of the Pa-

olico Coast every practical advantage of the Signal Service now provided by the Government, and which is enjoyed by other sections of the country.

Defects appear in the first edition that experience and better facilities will gradually eradicate. The public are kindly invited to make suggestions regarding the character and extent of the data published that will tend to enhance the practical value of the map.

JOHN P. FINLEY,

Lieut. 19th Infantry, S. O. in charge,
San Francisco, April 14th.

The World's Fair.

By a law enacted by the recent Legislature, the Governor was authorized to appoint a Board of World's Fair Commissioners as a controlling body concerning all matters wherein this State is interested and to control the expenditure of the \$300,000 appropriated for California representation at the Exposition. Governor Markham has named the following gentlemen to constitute the board: First district, John Daggott of Siskiyou; Second district, Robert Murray of Nevada; Third district, A. T. Hatch of Solano; Fourth district, Irving M. Scott of San Francisco; Fifth district, James D. Phalan of San Francisco; Sixth district, L. J. Ross of Los Angeles; Seventh district, Thomas H. Thompson of Tulare.

These commissioners have been selected to represent the State geographically and her leading industries as well. Live-stock, mining, fruit-growing, manufacturing and general farming and progress in land development are believed to be well covered by the appointments made, and certainly the men chosen are widely known, not only in their own regions, but over the State at large.

The progress of the World's Fair enterprise seems to be fairly active. The National Commissioners from California, who are now in Chicago, do not agree among themselves as to who should be chosen for the headship of the horticultural department of the fair, the candidate who has been generally appointed here has apparently been thrown out, and it seems to us altogether unlikely that the appointment will go to a Californian in view of this discord among our representatives, but this point is not settled yet.

According to recent reports the different States have appropriated nearly \$1,500,000 for the purposes of State exhibits, and there are other amounts still pending in the Legislatures of the different States. So far the California appropriation of \$300,000 is the largest made by any State. States which have defeated appropriations are as follows: Alabama, Arkansas, Kansas, Oregon, South Dakota, Tennessee and Texas.

Various comments upon the anticipated influences of the great fair of 1893 are being made. The following is a general view of the case which certainly has much force. Greater than even the reciprocal advantage of education between producer and manufacturer, American and foreigner, the Exposition as a unifier of the people of the United States will amply repay whatever money be spent in its preparation. East and west, north and south, the people of this country are gradually becoming provincialized as the process of local development creates new centers of interest apart from the capital or metropolitan cities. In the crowded cities of the East hundreds of thousands of people live and die in the belief that the Great West is still a rowdy wilderness peopled only by uncouth, semi-barbarian, and in like manner in many Western cities the idea of Eastern civilization is indelibly associated with that of effeminacy. North and South in like manner are each of them unknown countries to a large percentage of their opposite people. To efface this sectional feeling, the World's Columbian Exposition will be an agent of incalculable potency. Mingled together in one common ground, unnumbered in honor of an event equally beneficial to all, stimulated by individual interest and local pride, protectionist and free trader, manufacturer and farmer, Easterner and Westerner, Northerner and Southerner, American and foreigner will join hands to make the World's Columbian Exposition an event of which not only the American people, but the world itself and the great nineteenth century may justly feel proud.

Figures of the possible attendance at the World's Fair are also being indulged in. The attendance at the Philadelphia Centennial, as shown by the number of admissions, was 9,910,996, and at the recent Paris Exposition, 28,149,353. Large as was the latter, it is expected that the attendance at the World's Columbian Exposition will equal it.

It is telegraphed from Chicago that Commissioner De Young has selected as a site for the California building $1\frac{1}{2}$ acres of land nearly opposite the present boatwharf in Jackson Park.

A GORGEOUS MINERAL PALACE.—A meeting of the Directors of Colorado Mineral Palace Company was held in Pueblo, Colorado, last week, and bids were received and contracts let for the thorough completion of the Palace building, the work to be commenced and executed without delay. It is expected that everything will be ready for the opening of the exhibition to the public of the greatest collection of minerals in the most gorgeously handsome building ever attempted in the world, some time in June next, the exact date to be hereafter announced.

That Lost Mine.

Several miners have come back from the Pahrump valley, east of Death valley, where the recent discovery of gold-bearing quartz was made by the Montgomery prospecting party, and the lost "Breyfogle mine" was supposed to have been found. The quartz shown in San Francisco was quite rich, but later reports are not so favorable. Henry C. Callahan, late superintendent of the Eagle Bird or Diamond D mine, Nevada county, was one of the party who recently visited the camp, and he tells the Grass Valley Union that they found the camp and examined the lodes upon which prospecting had been done. The quartz prospected well in gold. The lodes were inclosed between lime and quartzite formations, the quartz being white and free from other mineral and of a character that the miner would call "angry." The evidences were not favorable of the lodes being true contact veins that would hold out in depth, but of that there has not been sufficient work done to determine. The Montgomery party had made a number of locations and had covered all the ledge to be found in that immediate section of country. This company had fitted out in Calaveras county, and Mr. Callahan says it was the best-equipped prospecting expedition he has ever seen, and its work was conducted on a very efficient plan. They had a large outfit, an abundance of supplies and a large transportation force of men and pack-animals. They had one main camp from which men and animals were sent out in different directions, and subordinate camps established, and from these, prospecting operations were extended in different directions, that enabled them to cover a large extent of country in their prospecting operations and to secure each locality as gave any promise of future value.

At the Montgomery camp, the water has to be brought from a distance of five miles, but taking that district generally, the water supply is good. At the northern end of the mountain range there is good timber, and one or more sawmills have been established in that section. There are now 60 prospectors in the new field. Mr. Callahan is not enthusiastic in regard to this new mining field, although there have been some excellent prospects of gold obtained. The country is isolated, and a long distance from a base of supplies, and development work can only be successfully prosecuted by strong companies. It is not a field for poor prospectors, and men who are not well supplied with means have no inducement to go there at present. A railroad survey has been made from Pioche to California, which skirts the Death valley region, but not immediately on the border of the valley, and should the road be constructed, it would be within five miles of Pahrump valley, and would afford an opportunity for the opening up of the mineral resources of the region, which, under present circumstances, is impracticable.

Electric Railroads.

After a great deal of opposition and discussion, the Legislature finally passed a bill permitting the use of electricity on street railroads in this State. The main objection came from San Francisco, where they objected to the use of overhead wires for these roads. This week an order was introduced at the San Francisco Board of Supervisors meeting, and passed to print, prohibiting the use of poles or any other above-ground apparatus for the propelling of street cars by electricity within the following limits: Commencing at the west line of Van Ness avenue and the bay, thence direct to Market street and across to Eleventh, thence to Bryant, to Tenth, to Channel, to Potrero avenue, to Alameda street, easterly to Eighth, to Channel, thence along Channel to the water front, along and around the water front to the point of beginning. The order also rescinds all permits hitherto given for the use of overhead poles, wires, etc., and provides for the forfeit of franchise by any company using them.

These limits include all the main central portion of the city, but not the outlying districts. Judging from the vote by which the order was passed to print, it is probable it will be eventually adopted. The effect of the order will be to stop such work as has been done at night on the water front of late, where an elevated railroad is being built.

As the law now stands, each California city may itself permit overhead wires or not, as it chooses. It is evident that the San Francisco officials do not want roads of this character here under that system in the main portion of the city.

ROCK BLASTING BY ELECTRICITY.—Messrs. James Macheth & Co., 128 Maiden Lane, New York City, have just issued a neat little pamphlet on "Rock Blasting by Electricity," together with illustrated catalogue and price list of Victor elastic platinum fuses, electric blasting machines, electric fuses and blast testers, wire reels, battery testers, insulating tape, leading and connecting wires made by them. The text which shows evidence of being carefully prepared is generously illustrated, and contains a great deal of valuable information for blasters in the use of the company's electric blasting appliances and rock blasting by electricity in general. This pamphlet can be had upon application.

Academy of Sciences.

The museum of the Academy of Sciences is approaching completion. Considerable work has to be done before the specimens are ready for exhibition. The collection of birds presented by Mrs. E. B. Crocker of Sacramento is already in place in the gallery. The Ward collection will be prepared for exhibition as soon as possible. The collection of birds prepared by the scientists of the Academy is still in the boxes, and will not be unpacked for some time. The big elephant, which is a fine simile of one obtained from the bank of the Lena river, in Siberia, will be on exhibition. The curator in ornithology is busily at work, as well as the botanists of the Academy. Large additions have been made to the botanical collection lately, and the collection is now one of the finest in the United States. The rooms are admirably adapted for the purposes for which they were designed. The museum building is on the rear of the lot. The front building was first completed and already brings in considerable of an income. The building is as nearly fireproof as it is possible to be. The materials are iron, stone and brick. The galleries are all of iron and the staircases also. The library is very valuable and many rare books are to be found in the collection.

Walter E. Bryant, Curator of the Department of Animals and Birds at the Academy of Sciences, recently discovered a new species of hare, to which he has given the name *Lepus insularis*. It is found only upon the island of Espiritu Santo, in the Gulf of California, off La Paz bay.

The hare is black, and it is rather larger than those found in California or Lower California, but possesses all the characteristics of the genus.

"This hare," said Mr. Bryant to a reporter, "is a great find. The Smithsonian Institute several years ago received two skins of the species preserved in alcohol, but overlooked them, and it has been left to our Academy to describe and name the hare."

"A curious feature about the species is that its color adds a proof of the opinion held by many, that color in wild animals always accord with the color of the cover in which they live. Trout are dark or light, gray, black, yellow or green, in accord with the general color of the bottom of the stream in which they may be found. The ptarmigan of Alaska is a rusty brown bird in summer when it lives in edge and brush, but in winter is snow white. The same is true of the Arctic hare."

"The new species of hare is so like in color to the dark granite rocks on Espiritu Santo as to be indistinguishable when at rest. When it comes down from the rocky retreats into the grass land to feed it can hardly be seen, but at the slightest alarm it runs to the rocks and is lost to sight, because its black color is like that of its surroundings. In lower California the hare lives on sand deserts and is light gray, just like the sand and scant herbage about them."

THE ONTARIO SILVER MINE.—The total output of the Ontario Silver mine near Park City, Utah, from the starting of the new mill Feb. 1, 1877, to the end of 1890—fourteen years—was 341,497 net (dry) tons of ore out of which was obtained 24,398,359.99 ounces of fine silver, and for this silver the company received \$24,607,292.88, a fraction of a cent more than \$1 per ounce. As the bullion was sold as produced each month, this is as fair an average of the price obtainable for silver during the last 14 years as it is possible to obtain. Out of the money received the company paid up to January 1st of this year 175 monthly dividends of 50 cents per share, aggregating \$11,525,000. Of these 175 dividends 64 were paid on 100,000 shares, 111 were paid on 150,000 shares. The stock was increased by 50,000 shares to pay for new ground in 1881 or 1880. The average yield per dry ton was \$72.06. It would be hard to say correctly what percentage of moisture should be added to ascertain the number of tons of ore as raised out of the mines, but probably about 15%. For a considerable part of the period under consideration the moisture was 25 per cent of the weight. Assuming that it was on the average 15 per cent, the output was 392,721 gross or wet tons, and the yield per wet ton was \$61.26. The total output of the Daly silver mine, an extension westward of the Ontario from January 1, 1885, when it began to produce, down to the end of 1890, was 120,706 net tons, from which was obtained 5,530,830.87 ounces of fine silver; this silver sold for \$5,106,684.69. Out of this money 46 dividends were paid, aggregating \$1,762,500; the average yield was \$42.30 per dry ton; or, adding 10 per cent for moisture, \$38.07 per wet ton.

IN THE FAR NORTH.—A new mining country is engaging the attention of the adventurous at present, and as soon as the summer season opens a rush for the new "diggings" is expected. It is the Kootenai-Flathead country, situated in Missoula county, near the Washington and British lines. The Flathead valley is said to be a rich agricultural country, coal is to be found in abundance and water communication is had with the coast by means of the Flathead lake, Flathead river and the Columbia river. In a short time the country will be traversed by two railroads. The Great Northern, which has its western terminus at Fairhaven, Wash., is constructing a road, and the Northern Pacific is building a road

from its main line northward to connect with the Canadian Pacific in the British possessions. The mines have never been fully developed, but the ore is said to be of a remarkably high grade and only the absence of transportation facilities has kept them in the background. The principal town is Demareville, which, although only one year old, has a population of nearly 2000. It is a frontier town, with all the attractions which the name implies, and "spring of '50" prices prevail. A new town has just been located by the Great Northern Railroad, and tenderfoot are settling up the country very rapidly.

THE DRUMMOND MINE, Marysville, Mont., produced in the last half year 42,753 tons of ore, worth \$4,526,576. The average cost of mining and milling per ton was \$8.30, a decrease of 89 cents per ton from the previous six months. The total output for last year was \$1,097,345.55. Four dividends of about \$34 each were paid the shareholders during the year, who now number 2890. The ore reserve on December 31st showed 187,200 tons in eight. The total lineal development of the mine for the year was 10,698 lineal feet, and the total lineal feet of development in the property at that date was 42,240 feet, or about eight miles. R. T. Bylles, general manager, and G. H. Robinson, deputy manager, have resigned, but have not entirely severed their connection with the company. Mr. Bylles is to be a director in London.

PLUMAS COUNTY SLICKENS.—A. E. Agassiz and Quincy A. Shaw have begun suit in the United States Circuit Court against John B. Sotton et al., for an injunction. The plaintiffs own 1500 acres of land in American valley, Plumas county, the greater part of which is protected from the overflowing of Spanish creek by embankments. The defendants own a placer mining claim farther up the creek, known as the Hungarian Hill gravel mine, and the plaintiffs say that the washings from this last mine come down the creek and threaten to inundate their land. Work has been stopped by the defendants for some time, but they are now preparing to begin work again, hence the suit to restrain them.

IRRIGATION ENTERPRISES.—Irrigation enterprises seem to be progressing vigorously at the South. It is telegraphed from San Bernardino that the pipe line to Alessandro is nearly completed and the water will be turned on next week. Nearly 500 laborers are at work putting in distributing pipe on the Alessandro tract, 80 miles of which is being laid. The Arrowhead Reservoir Company, organized in Cincinnati, with a million dollars capital, will commence work soon putting in a system of reservoirs in the mountains north of San Bernardino on the head waters of the Mojave river. Half a million will be put into the enterprises this year, and 80,000 acres or more will eventually be irrigated.

NAVAL OBSERVATORIES.—It is stated that many leading astronomers of the United States are uniting their forces and will memorialize the next Congress to transfer the control of the United States Naval Observatory at Washington from the hands of the Navy Department to the hands of a purely scientific and astronomical board. This is the outgrowth of dissatisfaction among the various observatories, growing out of the practice of the Naval Observatory of supplying telegraph companies with time signals for commercial use.

BALL BEARINGS.—Among the patents issued by the Patent Office on Tuesday, were 17 to George F. Simonds of Fitchburg, Mass. This is the largest number granted in a single day for many years, but the case is also interesting, because the inventor has, it is claimed, successfully solved the problem of applying the principle of ball bearings to the heaviest machinery. Hitherto it has only been possible to see these bearings on light machinery.

SULPHUR.—The Yuma (Arizona) Sentinel says: Lying to the southwest of Yuma, about 75 miles, on the west slope of the Coconino mountains, there is the largest deposit of pure sulphur that has ever been found on the American continent. It is situated on or in the side of a mountain, about one-half way up the summit. The deposit is about 1100 feet in length, 70 feet wide, and so far as opened is 40 feet in height.

BEETLES.—A Woodland scientist asserts that 20 different varieties of beetles are infesting that pretty little town. They come from the tule swamps in such swarms that sometimes the electric-light globes have to be cleaned. Chinese are employed for the work, and they pack the beetles into sacks and use them in compounding medicines.

WASHINGTON COAL OUTPUT.—The output of coal from the Newcastle, Cedar Mountain, Black Diamond and Franklin mines during March was 37,378 tons, as compared with 31,854 tons for February. The output at the Roslyn mines was 26,172 tons, a slight increase over that of February.—Seattle Post Intelligencer.

THE GRASS VALLEY TELEGRAPH says: Black sand from Dutch Flat will be worked at the new extraction works of this place. The black sand has gold in it and the extraction works will get the precious metal out so that it can be made into \$20 gold pieces.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador Ledger, April 12: The mining industry is moving along in the usual way. At the North Star they still have indications of ledge matter, but nothing to be elated over. They are still pushing ahead in the hope of encountering something. The Lincoln is running steadily, with prospects of continuing all summer. The sulphurets works are running full blast and in condition to run for a long time without repairs. The pipe for the Mahoney mine is laid and the work of getting the mill in repair is progressing as rapidly as possible. It needs a good deal of repairing, having lain idle so long. It will probably be a month yet before the stamps are ready to drop.

PLYMOUTH.—The Plymouth Con. Co. is all ready to start up 40 stamps, and will be pounding away on good rock before this is in print. The New London mine is still working away as usual, and it would be no surprise to this community to hear the stamps at that mine running before long. There will be a call for a meeting of the shareholders of the Bay State mine for the purpose of effecting an organization of the company and going to work before long. The stock is about all taken, and the assessment money will be paid in as soon as called for. There will be nothing to stop this popular mining venture from being in full blast by the middle of June. The Good Hope is lying still at present, preparatory to putting in some new machinery. Theo. Etling & Co. are making arrangements to start up the Mammoth. There have been some fine assays from rock taken from this mine lately, going as high as \$70 to the ton. There is a good deal of placer mining and prospecting going on in the near vicinity of Plymouth and considerable gold is being sold to our merchants.

VOLCANO.—The old A. P. Clough place has been sold to a San Francisco company. Work has commenced on the mine and machinery ordered for a mill, which will be built as soon as the material can be got on the ground.

Calaveras.

UTICA.—Angels Echo, April 9: The following-named gentlemen have taken a contract of sinking the Utica mine 230 feet deeper: T. C. Halstead, James Murray, John Doubt and Charles Smith. The shaft is at present 600 feet deep and when the contract is completed will be of course 830.

AT WEST POINT.—Cor. Calaveras Chronicle, April 12: Dull clouds of depression have been hanging over the sombre town of West Point since the closing down of the Riverside and Lone Star mines, but there are indications of these clouds drifting over, for it is rumored that these mines will resume work. The good and promising Lone Star mine will be worked in the future to some extent by Burleigh drills and great results are anticipated by good and practical miners, for it is the intention of the company, it is thought, to run levels and well develop the mine. The permanent and nonpareil mine—the Blazing Star—has been working all winter, with a small force, developing the mine by sinking and running levels. The mine has splendid indications of being a permanent and remunerative piece of property for many years to come. The last year has changed the mine beyond the most sanguine expectations.

MINE BONDED.—The well known Boston Mine, near Sandy Bar, on the Mokelumne River, which has been idle for many years, has been bonded to Mr. Kreling, of San Francisco. A tramway is being constructed from the mine to the Sandy Bar Co's mill on the Mokelumne River, for the purpose of transporting a hundred or more tons of rock to be tested, upon the favorable result of which a plant suitable to work the mine upon an extensive scale, will at once be put up. Col. W. T. Robinson is in charge of the present operations.

ANOTHER MINE OPENING.—F. J. Horswill has obtained the ground formerly belonging to what was known as the A. & B., or Arrowsmith mine, near the old "Flume House" site, on the "Poor Man's Gulch" slope. An incline is to be run. Steam hoisting works are to be put up, a road to the location is now being constructed, on the completion of which, the machinery will be laid upon the ground.

Inyo.

MINING PAYS BEST.—Independent, April 10: Chris Crohn discovered that farming in Sonoma did not pay and returned to Inyo last summer to resume mining. He has been engaged for several months past in developing the Augusta, a patented mine owned by him about 3½ miles north of Cerro Gordo on the Saline side of the ridge. A piece of ore taken from the ledge was brought to town to be sent below for assay. It is black metal and will assay at least \$500 per ton. A tunnel is being run on the ledge, and some of the ore is being taken out for shipment. The mine is likely to develop into a valuable property.

Nevada.

NORTH BANNER MINE.—Grass Valley Union, April 12: Some high-grade ore is beginning to show in the north drift of the North Banner mine, that gives the appearance of a new shoot coming in. The quartz is heavy with sulphurets and galena, and shows fine particles of gold, and its general appearance is excellent. The vein from which this quartz comes is 20 inches in size, and goes down below the floor of the drift. It was not expected that rock of such quality would be found at that point, as the pay shoot coming down from the levels above is farther to the north. The North Banner is certainly making an excellent showing, as it has entered upon the payment of monthly dividends, which are likely to be kept up for an indefinite time.

PROSPECTING AT SPENCEVILLE.—Grass Valley Union, April 12: From Pietsch, of the Spenceville Copper M. Co., the Union learns that prospecting operations are going on steadily in that vicinity on several claims. The lodes of that section contain copper, silver and gold, and the prospecting now being done is mainly on gold-bearing veins. The Champion is considered a very promising prospect, as it makes an excellent showing in the shaft that has been sunk on the croppings, and a tunnel is now being run to cut the vein at the depth of several hundred feet. The tunnel is now in a distance of

275 feet, with several hundred feet yet to be run. The vein assays high in gold and also contains silver. The Mammoth Co. is also running a tunnel, which is in a distance of over 300 feet; and work is being done on several other claims. All the development work is being done by tunnels. The Spenceville section has many mineral leads that prospect in gold, but the most attention heretofore has been on copper bearing veins, but it is believed the district will yet have its greatest prominence as a gold producing region. The Spenceville Copper Co. is regularly producing profitably in cement copper, and also in the production of mineral paint, furnished by the dump piles of copper waste of which the company has about 250,000 tons.

W. Y. O. D. DIVIDEND.—The W. Y. O. D. M. Co. has declared a dividend of 5 cents per share, amounting to \$1500. This is the second dividend declared by the company, and it is the expectation that they will be continued regularly each month, as the mine is making a continuous profitable output. This is being done with a small five-stamp mill, but the company is now engaged in putting up a new ten-stamp mill, which when completed will enable a much larger production, as the mine is sufficiently opened and the vein of size large enough to keep that number of stamps constantly employed. The ore of the W. Y. O. D. is of high grade, yielding about \$50 per ton.

NEW HOISTING WORKS.—Grass Valley Union, April 10: The Idaho Co. has put up a hoisting plant at the eastern end of its location and about 400 feet west of the line of the Maryland claim. This is over a prospect shaft that was sunk at that point and where a strong vein is shown. The shaft is now being strongly timbered and will be sunk to prospect the vein in that part of the location, which is over 2000 feet distant from the main hoisting works and mill. The hoisting and pumping will be done by water-power, which will be obtained from the Idaho pipe line, which passes close to the new works.

STRIKE AT THE DELHI.—Transcript, April 11: A four-foot ledge of very rich ore was struck Thursday night in the lower tunnel of the Delhi mine near Columbia Hill, and there is much excitement over the development. On two or three occasions recently, rich finds in the tunnel have been reported, but they did not prove extensive. It is now, however, certain that the main formation which proved so valuable in the upper workings has been reached. There are now 15 or 20 men employed at the mine, but as soon as the tramway now in course of construction to connect the mouth of the tunnel with the mill is completed the services of three or four times as many will be required.

SECURED WORKING CAPITAL.—Grass Valley Union, April 10: George F. Jacobs, who is to be Superintendent of the Manzanita gravel mine, at Nevada City under the new company organization, has sold 20,000 shares of the stock, which was the amount set aside to raise a working capital. The Manzanita, that is on the same channel as the Harmony, which is now giving fine prospects, is to be worked by drifting, and the company is confident that it will renew the profitable output of former days when it was operated as a hydraulic mine.

Mono.

THE MAY LUNDY.—Homer Mining Index, April 11: In reply to inquiries we will say that we are not informed as to the intentions of the May Lundy management. Nothing is being done at the mine now, though we should think they would be somewhat interested, considering the promising condition of mines on the south, and feel themselves warranted in starting work, on a small scale at least. The mine is still a good one, having never been systematically worked, but only outrageously gouged into the semblance of a rabbit warren. It has been the foot-ball of masterly incapacity and stupid inexperience, yet there are lots of gold left, much more than if the mine had been properly developed. A good deal of the ore extracted was worn out before it reached the dump, being handled so many times. If the management will give us the sweepings, we will contract to clean out the accumulated waste and debris, or dispose of it in some manner that will make the mine halfway presentable. From the clean-up we could obtain a nice little wad of gold.

Placer.

FOREST HILL.—Placer Herald, April 11: The Gray Eagle mine, located a short distance below Forest Hill, is developing some good gravel. The upraise which was mentioned in the Herald a few weeks ago as being made 1670 feet from the mouth of the tunnel, has been completed. It cut through into the gravel 168 feet above the tunnel. It was found to be too high, as where it broke through, the bedrock was pitching pretty steep. Down 19 feet from the top a drift was run into the channel, and it, we understand, is high, but it developed some gravel which from the prospects will pay \$3 to \$4 to the car.

Plumas.

THE DRURY MINE.—Greenville Bulletin, April 8: The Drury mine, now owned by Standart & McGill, will soon be operating in full blast. The future of this property was never brighter. In the lower tunnel there is said to be a large quantity of high-grade ore. The Bulletin has always maintained this to be a big property. The experience of the past few months is proving this view to be correct. The company owns back of the Drury the Pacific and the Forest King, which, doubtless, are parts of the same lode cut by North canyon.

Sierra.

TRAMWAY.—Mt. Messenger, April 11: New machinery for the tramway at the Mountain quartz mine, to replace that which did not work, has been shipped from San Francisco.

Siskiyou.

GRAVEL DEPOSIT.—Siskiyou Telegram, April 11: Mr. L. A. Lash, of the Lee, Lash & Parlin blue gravel mine on Greenhorn, is very enthusiastic over their find. In a conversation with him last Sunday, he expressed his entire confidence in the permanency of this rich gold deposit and expects that when their new machinery will be in place and in working order, that, owing to the increased facilities, for working, the mine will pay much better than at present. They have but very little trouble with water, and it is not found necessary to work the pumps over a few minutes each day. The gravel is found below a formation of sandstone, which accounts for it not being worked years ago, as whenever the miners struck this formation they always stopped, supposing that they had found bed-rock and could

go no farther, until, at last some miner, to satisfy his curiosity, pushed on through the sand stone, and discovered what we now call blue gravel. It is more than likely that this same valuable deposit exists in many other parts of the county, where its presence is not now suspected. The discovery of a blue gravel mine near the Black mountain, nearly half way between Yreka and Henley, goes to show that the Greenhorn lead and that at Henley is the very same, and we may expect that every foot of ground between here and there will be claimed in a short time, and some great bonanzas discovered.

BLUE GRAVEL.—Yreka Journal, April 8: The Yreka Blue Gravel M. Co. has sent George Kenyon to S. F., for the purpose of securing artesian well boring machinery, to be used in prospecting for blue gravel south of Yreka. He will also purchase a new steam engine and pump for the Lee, Lash, Parnell and Kenyon blue gravel mine, of great capacity, to take the place of the machinery now rented from Scheld. The blue gravel mine of Lee, Lash & Co., at Greenhorn, still continues the usual average, except last Wednesday, when it paid \$40 better than general. The gravel taken out yields not less than \$125 to \$150 per day, most of the gravel being very tough and hard to dig. As the men progress in extending the drifts, they find the bed rock raising a little occasionally, with a yellow gravel in shallow places, which pays just as rich as the blue gravel. Not more than two-thirds of the pay gravel can be washed at present, on account of its sticky nature, but it dissolves easily on exposure to the sun for a number of days.

QUARTZ.—The miners at work in the Spencer & Co. quartz ledge on Humbug, are down about 200 feet, and find the ledge varying in width from a foot to four feet wide, with well defined walls, every pound of the quartz taken out paying well. W. D. Shelly's portable engine, from Scott Valley, is now being fixed up at Nerhass & Harmon's shop, for use in running the quartz mill moved from Yreka Flats to Long Gulch, at upper end of the flats, and as soon as the batteries are set up, the mill will be started, with an abundance of quartz on hand to keep going all summer. Charley Abbott is now sinking down on his ledge at Greenhorn creek, which paid so well last summer, to find where it was broken off, as the croppings on surface shows the ledge had been pinched out and thrown over flat. The indications in the bed rock of shaft give promise of a rich ledge below the surface. Van Nader, who has a quartz ledge at Spring Gulch, on Yreka Flats, northwest of Yreka, has been taking out some very rich specimens lately, the gold running through the quartz like wiring, fine samples of which can be seen in the mineral cabinet at Ed. Herr's saloon in Wetzel's building. Van Nader has evidently struck a very rich pocket, which may develop into a permanent ledge as the work of opening his claim progresses. He has realized considerable gold already, by pounding out the quartz, many specimens being pure gold. Louis Guilbert, who has been sinking a shaft to bed rock in the Kidore Hills, about 3 miles south of Yreka, struck a heavy body of water at 65 feet, and is now making arrangements to put in a pump that will prove effective in keeping the water out. Louis Nerhass owns several acres of land, or a farm, on Greenhorn, adjoining the Lee, Lash & Co., blue gravel mine, near the Greenhorn school house, and may become a millionaire in the near future, as the blue gravel channel no doubt runs under the foundation of his ranch. He intends to have a well bored down to ascertain if blue gravel exists there, when the new machinery sent for arrives from below.

HORN BROOK.—Cor. Yreka Journal, April 8: The gravel in Jillson & Co's. mine is quite soft, pipes and "washes" very freely, and as rich as ever. In their tunnel, 180 feet long, the gravel is as blue as indigo, and easy picking ground. Mr. Jillson thinks he will have 100 feet more to run before striking bedrock. The gravel already shows prospects. The Black Jack is prospecting better, the gravel at present being good for six dollars per ton. This company will, probably, in the near future, put up extensive works to crush their gravel. The Portland Company's shaft is down 40 feet. J. W. Luten is in 138 feet, and expects to strike gravel in the next ten feet. Captain Wilbourn is letting a contract to drive his main tunnel. A report is circulated in town this week that George Bar has struck rich gravel on the south side of Black mountain, and about half way between Hornbrook and Yreka. Mr. H. C. Babcock has purchased a half interest in the Nels. Thompson mine, and will begin development work. A company of eight Hornbrook men have organized and located 160 acres of blue gravel, and will prospect it thoroughly with a diamond drill. They are now negotiating for a diamond drill and will have it in operation by the first of May. This property is located in Rocky gulch, and none richer was ever worked in Siskiyou county. Everything bespeaks success to them, for a more desirable location could not be found. Hill & Co. have gravel in their tunnel with bedrock pitching, and they expect to reach the channel. Hazlett & Jacobs are crosscutting in the California Queen, with favorable indications of soon striking the ledge. Jones and Hazlett are receiving encouraging news from their Hungry Creek quartz, the ledge being both strong and rich.

Trinity.

THE THANKSGIVING MINE.—Journal, April 11: W. F. Arnold informs us that the outlook for the Thanksgiving mine at East Fork is very encouraging. Since he has taken charge of it he has opened up a body of ore that will keep the mill running for several months. This property has been lying idle for some time, in fact the most of the time since Mr. Peterson left it, but there will probably be quite a stir there this summer.

Tuolumne.

GOLDEN GATE.—Tuolumne Independent, April 11: Supt. Loftus of the Golden Gate mine informs us that their new water-power is in operation and that the reduction works are being enlarged; also, that grading has commenced for 10 additional stamps, making a total of 20.

NEVADA.

Washoe District.

CONS. VIRGINIA AND CALIFORNIA.—Virginia Chronicle, April 11: There has been extracted from all parts of the mine during the week 1516 tons of ore, which were shipped to the Eureka mill. The average assay value of all of the ore worked at that mill during the week (1525 tons) was \$34.10 per ton.

OPHIR.—The upraise started in the drift run south from the drift run west from the winze, 122 feet below the sill floor of the 1300 level has been carried up 16 feet, and some ore has been extracted therefrom and stored in the mine, the average assay value of which is \$24 per ton.

UNION CON.—East crosscut No. 2 on the 1465 level, started from the north lateral drift at a point 200 feet south from the south boundary line of the mine, has been extended 24 feet; total length, 794 feet, continuing in a hard porphyry formation.

MEXICAN.—The east crosscut No. 1, started from the main north lateral drift at a point opposite the west crosscut No. 1, has been extended 23 feet; total length, 631 feet, passing in porphyry interchangeably hard and soft.

EXCHEQUER.—East crosscut on the north line, 600 level, is out 161 feet; face in porphyry.

CROWN POINT.—The south drift on the 300 level is out a total distance of 102 feet having been advanced 26 feet during the week. The face is in a mixture of clay, porphyry and low-grade quartz. The west crosscut, 1000 level, has been extended 25 feet, making its total length 50 feet. It has passed through low-grade quartz and clay, and has reached what is believed to be the footwall. Have been engaged in timbering and repairing the 1100 south lateral drift where necessary.

BELCHER.—The south drift from No. 2 east crosscut, 300 level, is out a total distance of 144 feet; face is in a mixture of clay, porphyry and quartz. West crosscut No. 3, 300 level, has been advanced 35 feet since last report, making its total length 267 feet. The face is in porphyry, clay and small streaks of low-grade quartz. The east crosscut on the 1500 level is out 37 feet; the face is in hard porphyry.

SEG. BELCHER.—On the 600 level the east crosscut from the south lateral drift has been advanced 23 feet since last report, and is now out a total of 331 feet. The face is in soft porphyry.

JUSTICE.—The north drift on the 822 level is still showing quartz that gives low assays.

POTOSI.—East crosscut 400 feet south of shaft, 930 level, continues in a mixture of quartz, clay and porphyry. The bottom of the winze below the 1300 is still in porphyry that shows some quartz. The east crosscut on this level continues to show stringers and feeders of quartz.

CHOLLAR.—Good progress is making in the drift that was recently started 60 feet above the 550 level, at a point 300 feet north of the Sharon shaft. The south drift, 1400 level is still showing streaks of quartz. The east crosscut on this level at the north line continues in porphyry. About the usual amount of ore is being extracted, the average assay of which is a little over \$20 a ton.

ALTA.—The Alta is expected to start up in about 10 days. Supt. Boyle will, in a day or two, inspect the shaft and the height of the water in the mine.

ANDES.—The east crosscut from the south lateral drift on the 420 level has been advanced 18 feet; face in a formation of vein porphyry and clay. Easing timbers in main north drift, 420 level.

OCCIDENTAL.—Extracting ore of fair quality from the stopes on the 400, 600 and 650 levels. A considerable amount of exploration work is being done.

CHALLENGE AND CONFIDENCE.—The joint Confidence and Challenge west crosscut from the north drift on the 300 level is out 62 feet, having been advanced 16 feet this week. The face shows quartz having no value. The joint Yellow Jacket, Confidence and Challenge north drift on 100 level is in 661 feet, 34 feet having been made during the week. The face shows quartz having no value.

UTAH.—The main west drift, still shows material that yields small assays.

CON. IMPERIAL.—We are still following up and taking out small streaks of ore from the upper levels and prospecting in and around the old stopes, where we find some fillings and bunches of ore of fair grade, which is being shipped to the Vivian mill for reduction.

SIERRA NEVADA.—630 level.—From west crosscut No. 1, 155 in, a north lateral drift has been advanced 43 feet. The material passed through being porphyry and clay.

HALE AND NORCROSS.—On the 1100 level of Norcross No. 4 west crosscut near our north boundary was advanced 30 feet; making its total length 170 feet; face in quartz and porphyry. No. 5 east crosscut started on our south boundary was advanced 55 feet; face in porphyry with stringers of quartz. The crosscut is being run jointly with the Chollar Co. At the end of No. 3 east crosscut we are sinking a winze, which is down 20 feet; the bottom shows some good ore. The main incline is now repairing and retimbering 120 feet below the 1400 station. We have men on repairs in the main shaft and during the week we have hoisted from the Savage 548 cars of ore from the 500, 700, 800, 900, 1100 and from the intermediate drifts north and south from the winze below the 1300 level. Shipped to the Mexican mill 528½ tons and milled 424 tons. Average battery assay \$15.60. The bullion yield of the mine for the month of March was \$26,439.16. The upraise from 300 level was advanced 10 feet; total height 147 feet. The top is now in low-grade ore. From the stopes below the 800 and 900 levels we are extracting good ore.

SAVAGE.—We have hoisted 541 cars of ore from the 500, 700, 800, 900 and 1100 levels and from the intermediate drifts north and south from the winze below the 1300 level. Shipped to the Mexican mill 528½ tons and milled 424 tons; average battery, \$15.60. The bullion yield of the mine for the month of March was \$26,439.16. The upraise from the 300 level, has been advanced 10 feet, total height, 147 feet. The top is now in low-grade ore. From the stopes below the 800 and 900 levels we are extracting good ore.

GOULD & CURRY.—200 level: Extracted from old stopes during the week 42 cars of fair quality. Have done some repairing on the 300 and 400 levels in order to keep our air connections open.

BEST & BELCHER.—1000 level: Repaired 20 feet of north drift during the week. 1100—all work in west crosscut No. 1 has been stopped. Northeast drift from east crosscut No. 1 has been extended 25 feet; total 59 feet through porphyry and stringers of quartz showing some value.

Tuscarora District.

NAVAJO.—Times-Review, April 11: Stopes on the 350 level are still looking well. The vein is small but very high grade.

BELLE ISLE.—Drifts from the intermediate crosscut from No. 1 chute, 350-foot level, extended 18 feet. No. 2 chute, same level, extended 7 feet. A

crosscut has been started from the top of No. 2 chute to get at the ore cut by the intermediate crosscut from No. 1 chute.

NEVADA QUEEN.—East crosscut on 650 foot level advanced 13 feet through very hard porphyry. Stopes are producing some high-grade ore.

NORTH COMMONWEALTH.—First level.—Has produced 25 cars first class ore, average car sample \$248 per ton, and 38 cars second class, average \$24 per ton. Second level.—North drift from west crosscut has advanced 20 feet, not looking so well, seams of good ore still in the face. Third level.—West crosscut has been extended 28 feet in porphyry. Fourth level.—East crosscut has been extended 35 feet, water coming through the face.

NORTH BELLE ISLE.—North drift from Belle Isle 450 foot level extended 28 feet, the face continues to show bunches of high-grade ore. No. 1 upraise from the same drift extended 14 feet, the vein in the top is wide and is showing some very rich ore. Resumed work in the east crosscut opposite the vertical winze, 400 foot level, and extended it 17 feet, cutting some good ore. The 300 stopes are producing 12 cars of first class and 112 cars of second class ore. North intermediate drift from No. 4 chute, 600 foot level, extended 10 feet, showing some very fine ore.

COMMONWEALTH.—Fourth level.—West crosscut has been discontinued, and a drift started north on a stratum of ore assaying \$76 per ton. East crosscut has been extended 24 feet in porphyry. North drift extended 13 feet, face showing ore assaying from \$30 to \$86 per ton. Water broke through 10 feet back from the face, started to cave so cannot work, and have started drift in footwall, will take a week to get into the face again. The ore is exposed in the face of drift 2 feet wide, and still showing in the footwall side. It was improving as the drift advanced north. South drift extended 10 feet in the vein, giving low assays, but of no value.

Hot Creek District.

SILVER ORE.—Belmont *Courier*, April 8: J. W. Merritt presented us last Wednesday with two rich specimens of silver ore which was recently extracted from the ledge in the Merritt & Wagner mine, situated in Hot Creek district, Nye county. Specimen No. 1 assays over \$5000 to the ton and specimen No. 2 assays over \$2000 to the ton in silver. Mr. Merritt informs us that the mine is looking well and that the ore extracted from it is shipped to Salt Lake City for reduction.

BRITISH COLUMBIA.

CARIBOO.—New Westminster *Ledger*, April 8: A representative had an interview with Mr. J. Bowron, Gold Commissioner from the district of Cariboo, and also with Mr. W. C. Price, foreman of the Government reduction works at Bikelville. It was learned from Mr. Bowron that a large bed of auriferous gravel has been discovered running parallel with the Canal river and extending for about ten miles, every linear foot of which has produced the value of one dollar. This bed, which was discovered by some Chinamen working close to the forks, lies behind the perpendicular cliffs which here border the river. It is now taken up both above and below the forks, and among the firms working on it are the following: The Victoria Hydraulic Mining Co., the South Walk, Champion, Pomeroy, and Whittier hydraulic mining companies. Mr. Bowron considers this one of the most important finds that has been made for many years. Both gentlemen were warm in their praises of the good work done by the reduction works, under the able superintendence of Mr. E. A. Martin, a gentleman in whom all have the most unbounded confidence, and it is their opinion that these works will do wonders toward developing the quartz mining of the districts, which, on the showing of the Black Jack mine, undoubtedly has a great future before it. But on the other hand both Mr. Bowron and Mr. Price are positive that a railway going by way of Yellow Head pass is an absolute necessity to the thorough development of the country, both in its mining and farming districts.

ARIZONA.

NOTES.—Arizona *Journal-Miner*, April 9: Work on the Ryland mine and mill at Minnehaha will be resumed inside of 30 days. There is some talk that an Eastern company will shortly take hold of the cinahar property in Copper basin. The Dillon brothers are preparing for a shipment of high-grade ore to the sampler here from their rich strike near the Hillside. Placer mining in the foothills east of Skull valley still goes on, over \$200 in dust being received last week from that section. Another batch of rich gold ore was received yesterday at the sampling works from the Bullion-Producer of Messrs. Lang, Blake & Owens. Assayer Hetherington of this city gives a flattering report in mining from the number of orders brought to his office during the past few days for assaying. James Shirley brings the report from the Aztec works on the Hassayampa that the mill is running steadily on custom ore, and that for the present, operations have ceased in the mine. Nick Palmer is running the mill on Jersey tuch on ore from the Storm Cloud, owned by Fred Williams. The results so far shown from the run are satisfactory, and undoubtedly a sale will soon be made. The Crown Point group of mines below Walnut Grove are looking well, and the work of developing them is being actively pushed by Messrs. Brown, Merwin & Brodie. At present there is a force of 25 miners at work on the Congress. On the arrival of Supt. Murphy and the starting of the 40-stamp mill over 100 men are to be put to work. H. L. Jones, who lives a few miles south of town, is the possessor of a claim he recently discovered near his home, which is very rich in gold ore. The work of remodeling the Tiger mine machinery and retimbering the shaft still goes on. A force of 20 men is at present employed under the superintendence of Harvey Helm. It is expected to start the mill crushing inside of 30 days. New timbers have been placed in the Silver Belt, and the work of starting the pumps to clear the shafts of water will begin this week. Work has been resumed in a spirited manner on the Quartz Mountain group of mines, formerly the property of Dan O'Boyle. A Mr. Taylor, representing the Kansas City syndicate, is in charge, and has let several contracts in sinking and drifting, in which a large number of men are at present engaged. There is considerable excitement and bustle in Oak Gulch on the Hassayampa over the recent strike of Mr. Clark on a new claim. The ore vein is about a foot in width and goes over \$300 in free

gold. John Thompson is sinking steadily on the Black Hawk and has many tons on the dump for treatment at the Aztec mill near by. Dan O'Boyle has a force of 10 men on the Lone Pine and Reindeer claims. He intends to run 300 feet farther on these properties and mill the ore at the custom mill. There are 300 tons at present on the dump to treat.

MCCRACKEN.—Mohave *Miner*, April 11: We hear it rumored that the famous McCracken mine near Signal has been sold to Colorado parties for a quarter of a million dollars. The mine is well worth the money and it is worked on mining principles will be one of the largest bullion-producers in the west. The mining outlook in and around Mineral Park is brightening up and the probability is that more men will be worked in the mines here this summer than at any other time during the past 10 years. Wm. Brown is doing considerable work on his gold claim in Weaver district. A new road is being built from his claim to his new arastras and as soon as completed he will commence grinding out bullion.

CUPEL.—A very important strike has been made in the winze in the Cupel, on the Tiger ledge. About eight inches of almost solid ruby ore has been encountered in sinking from the old level. Another contract has been let on the main shaft and it is being pushed as fast as men and muscle can do it. As many men as can be conveniently worked have been put on and as soon as stopping ground is opened the force will be greatly augmented.

COLORADO.

SAN JUAN.—Silverton *Miner*, April 9: The mines of San Juan county that are just emerging from a winter's development never looked better, nor the future more hopeful. The holders of prospects will never see a better demand for claims than there will be this season, and it behooves them to get a move on and show them up to the best advantage. Capital is heading for Silverton.

DAKOTA.

NIGGER HILL TIN.—Deadwood *Pioneer*, April 11: Capt. O. C. Taylor, of St. Paul, who by the way, has been in every tin mining district of note in the world, after thorough investigation, has invested his money and staked his fortune as well as his reputation, on Nigger Hill tin mines. The result is that he now owns 45 claims in a body, with abundance of timber and water for mining and milling purposes. The machinery for a 150 ton concentration plant has been bought and paid for and will be in operation before many months, the boarding house and barn having been completed. Nigger Hill mine owners and those interested in the district are to be congratulated on the fact that a practical test of their ores is to be made.

A GOOD CLEANUP.—Deadwood *Pioneer*, April 10: The Chlorination works' cleanup for the last 15 days of March, was completed yesterday, and gave 570 ounces—\$11,400 pure gold, and \$1500 left in the slag to be reduced. The average product per ton was \$24. The result was satisfactory, and leaves no doubt as to the perfect success of the process. The works will be shut down from Thursday to Monday, pending the laying of the D. C. track to the mine, which will reduce the cost of transportation \$1.50 per ton.

IDAHO.

CARIBOO DISTRICT.—Salt Lake *Tribune*, April 8: Thomas Crane, merchant of Soda Springs, Idaho, is in the city. He gives a hopeful word for the Cariboo district this season. Supt. Erwin of the Nellie Mining Co. arrived from the East last week and went up to Cariboo to start up the 100-stamp mill owned by his company. It is believed that this property will produce much gold this year. Supt. Deliver of the American Placer Mining Co. is expected from the East in a few days to start work as soon as the water begins to run. There will be plenty of water there this season, and they hope to take out more gold than the two last seasons, when there was but little water. A great deal of money has been spent on this property in ditches and flumes.

PROSPEROUS.—Silver *State*, April 8: From B. H. Luther, who just arrived from Idaho, we learn the following: The Del Mar Co. is working 200 men on the White Talk lode. Its receipts for the month of March were \$110,000, and its expenses were \$28,000. The lode is 28 feet wide in places, carrying gold and silver. The town of Del Mar promises to be a good lively camp. The only drawback now is the scarcity of lumber, which has to be hauled nine miles by sledges through snow and several miles by wagon over a very muddy road. Mr. Luther thinks it will be six weeks before lumber can be got into the camp from the railroad. The snow was 10 inches in Del Mar and two feet in Silver City.

FROM SMOKY.—Wood River *Times*, April 10: About a dozen miners who have worked in Smoky are in town. The crust is not sufficiently thick to enable travelers to dispense with the use of Norwegian snowshoes altogether, and the divide will hardly be practicable for horses before the first of May. The King of the West hands have been laid off until about the first day of May, when Charles Reed, manager is expected to outline the summer campaign. There is more than enough ore out to pay all expenses; but it is feared that the discount on silver and the high rates of freight will cause a suspension of operations. The leasers on the Sunday mine have quite a width and depth of ore in sight, and expect to make big money. The heading of the lower tunnel in the Galore-Stormy is in quartz, and the flow of water from the breast does not seem to be any less than for months past. A good body of ore is reported in the Flagstaff mine. Joe Reedy is doing well on the Tyrannus but has nothing big yet. The Silver Star may shut down unless silver takes an upward turn.

MONTANA.

THE KEYSTONE IN ORE.—Helena *Mining Journal*, April 8: The Keystone, in Running Wolf District, and situated near the Mortson & Woodhurst mine, is said to have recently developed a fine showing of ore. The owners, Packard, Frazier & Woodhurst have followed the ore on an incline to a depth of 80 feet. At the surface, the vein was only one foot thick. This pinched until the ore streak was only two inches wide and continued about the same

for nearly 20 feet. It then commenced to widen and is now over five feet thick and all ore. The vein contains several kinds of ore, the principal being hard carbonate, running well up in silver, galena, chloride of silver and soft carbonate. Fifty tons of shipping ore have already accumulated on the dump which is growing perceptibly larger with each day's work. Mining men who have examined the property unite in the opinion that it will prove one of the bonanzas of the district.

STRIKE IN THE EXEMPTION.—A strike was made Monday on the 60-foot level of the Exemption, in Horse Canyon, near Butte. The chute is fully three feet wide and the ore will run fully 25 per cent copper and some silver. The vein is well defined and lies between tide walls. Considerable water came in with the ore.

OUTLOOK.—Montana *Review*, April 11: The mining outlook, so far as the precious metals are concerned, is very gratifying to all who are interested in mining in Montana. The erection of a smelter at Castle by the Cumberland Co. has given that camp an increased interest which nothing but the starting of a railroad for that point could exceed. Neihart and Barker are coming to the front in fine shape, and it looks as if Cooke City would make some advancement in spite of the fact that no railroad is probable this year. Around Helena there is much interest excited, and we are much mistaken if some of the gold properties in Oro Fino and Tucker gulches, within three or four miles of Helena, will not be largely worked before summer has come. Rimini mines will be worked to a larger extent this year than last, and the mines around Marysville will make a good showing also. The mines of Jefferson Co., contiguous to Helena, will turn out more ore than ever before, and more new prospects will be worked this year than in any previous one. Copper properties may not be profitable in the near future, but better times will create more demand for that metal, and before the year closes we expect to see copper bringing its old prices.

NEW MEXICO.

LITTLE GIANT.—Pinos Altos, April 10: Wm. Baxter is engaged in pumping the water from the Little Giant mine, with the object of keeping it below the first level, 143 feet. The Little Giant will be started up again in the near future. The gentlemen interested in this mine realize they have a good thing and intend to utilize it. The shaft of the Ohio will be sunk 30 feet more and then drifts will be run both north and south. The north drift will connect with a tunnel already in some distance. Charles Murton and Harry McCool have contracted to sink a 100-foot winze 456 feet on Aztec vein in the Kleptomania shaft. This winze is to connect the 250-foot with the 350-foot level. Robert Kirk and A. S. McDonald are the owners of the claim adjoining the Dimnick strike on the north. This claim is on the same lead and promises to rival its southern neighbor in the quality of its ore.

OREGON.

MYRTLE CREEK MINES.—Cor. *Oregonian*, April 10: The chief product of our mines has been gold, and the placer mines of Southern Oregon have always taken the lead. Nor is the gold of this region exhausted yet, by any means. Millions of dollars' worth of gold only await the appearance of some mining genius to discover a practicable and profitable method of obtaining it. The great drawback is the scarcity of water. There are large areas of these lands where water cannot be obtained at all. The Myrtle creek mines have been known for years and much gold has been taken from them, although the miners were compelled to work them by the use of what little water they could obtain by catching it in ditches dug on the side of the mountain and amounting only to the slight fall of their rainy season, usually lasting only a few weeks of the year. The character of the soil is very similar to that of the best gold-bearing regions of California—a red soil filled with small quartz, small nuggets of iron ore, black sand and bearing gold. One peculiarity of these mines is the absence of large stone. Almost every particle of the dirt can be passed through the sluice box. A more perfect mining field could hardly be imagined than these mines possess. They are situated on the side of a mountain which rises more than 600 feet high, and at its base flows the beautiful stream called Myrtle creek. Every foot of the mine can be worked. Recently some expert miners visited these mines, and on finding them to prospect exceedingly well and finding how much gold had already been taken from them, they set about to discover some method of overcoming the only obstacle that had so long prevented these mines from being worked—the scarcity of water. Their engineer discovered that they could, by digging a ditch 10 miles long, bring to the very top of the mountain, and extending the entire length of the mine, a stream of water sufficient to run two giants day and night during the rainy season. A stock company was organized and the mines (over 1400 acres) immediately purchased. The ditch has since been dug and the company is already operating a hydraulic. This stream will furnish water to run two giants during the rainy season only; but by digging a ditch 17 miles farther they can procure all the water that they can use the year round, and before the end of the year the company expects to have the remainder of the ditch in operation. The writer recently visited these mines and found that they prospect exceedingly well. Gold can be found in almost any pan of dirt taken up promiscuously anywhere on the mines. There is no flake or very fine gold, but it is in the form of small nuggets. Some of the prospects are exceedingly rich. The first cleanup will take place in less than a month, but the company will start a force of men to work on a short ditch this week, which will give them water the year round. They will take the water from Myrtle creek, which is probably the richest part of the mines. This ditch will be completed by the time the water falls in the other ditch on top of the mountain, and thus they will work the mine the year round. It will be a great boom for Oregon when the mines of Southern Oregon are thoroughly developed and the water question shall have been solved.

UTAH.

GILSON'S DUGWAY SAMPLES.—Salt Lake *Tribune*, April 8: The Union Assay office yesterday

made an analysis of two lots of ore brought in by S. H. Gilson from his Buckhorn mine, Dugway district. This ore has been exciting much interest the past few days, and it places Dugway above being entirely a low grade camp. There were two lots of ore, one being first-class and the other second, and the result is shown as follows: First-class, 9534 pounds ore, 9.7 per cent lead, 602 ounces silver, and 4.8-10 ounces gold. The analysis showed silica 37.4; iron 6.4; and zinc 9.9 per cent. The second-class ore, 7040 pounds, went 1 per cent lead, 136.5 ounces silver and about 1 ounce gold; silver, 24.7; iron, 1; zinc 2.4, and lime, 19.1 per cent. Such ore ought to make Dugway a big camp, providing there is much like this, and it is understood that the deposits are very great there. Already the news of this rich find by Mr. Gilson and some others has started prospectors toward the Deep Creek country, and it now looks as if there will be quite a stampede for that new Eldorado.

SAMPSON SHIPMENT.—James Johnston was paid yesterday for 110 tons of ore from the Sampson mine, Bingham. This ore assayed 54.3 per cent lead and six ounces silver, and sold for \$27.81 per ton. The Sampson is on the same vein as the Yosemite No. 2, and is giving promise of becoming a great property. It certainly has done well since ore was struck on January 2d last. Since then 440 tons of ore have been shipped and sold, and now 100 tons more is ready to forward to the smelters as soon as the roads are so it can be hauled to the railroad to ship. The mine is opening out larger and better as drifting on the vein is carried forward.

BUNKER HILL ORE.—J. C. Reynolds of Stockton is in with thirty tons of ore from his Bunker Hill mine, which will run about 20 ounces silver and 55 per cent lead. This property is opening out nicely. It has a shaft down 80 feet, and in drifting the face has three and one-half feet of ore.

OPHIR.—Salt Lake *Tribune*, April 2: Good news comes from the Trace and Banner property on the north side of Lion Hill, Ophir. H. E. Wylie of Ophir owns one half of it, and the other half belongs to Judges Bennett and Harkness of this city. Mr. Wylie has persistently stayed by the camp for several years and pushed work on the tunnel, which is now in 800 feet, and has reached a depth of 300 feet beneath the surface. About ten days ago the tunnel tapped a very rich body of ore, on which they have been drifting since, and it is now four feet wide. It is not only rich in silver, but carries a good amount of gold. This is free milling ore and promises to become the best strike ever made in Ophir district.

CENTENNIAL-EUREKA ORE SALES.—The Centennial-Eureka Co. sold twenty-four tons of ore yesterday to the Hanauer smelter. This was not of their higher grade, and yet it brought \$3,147.69, while the assays ran 7.4 per cent lead, 156.55 ounces silver and .465 of an ounce in gold.

HORN SILVER ORE SALES.—The Horn Silver Co. sold three lots of ore yesterday, aggregating 756 tons net. Of this Conklin got 330 tons for the Pueblo works, Scott & Anderson took 110 tons to send to the Aurora (Illinois) smelters, and the Germania Lead Works got 310 tons for treatment at their works below this city.

WASHINGTON.

RUBY HILL DISTRICT.—Spokane *Chronicle*, April 8: Mr. S. Lichtenstadter, a prominent mining man and banker of Ruby City, and widely known among miners, arrived yesterday in Spokane. On being asked the news from Ruby City, he said: There are comparatively few, if any, mines in operation now. The owners of the Fourth of July mine are getting ready to begin business and will employ about 40 men. Mr. Duval is now in the East negotiating for a mill to be put up at this mine. The Ivanhoe people have already gone to work with a full force of men. The mine has about \$150,000 worth of ore in sight. Mr. Cawder, one of the owners, is in Portland getting machinery for it. The Ruby Hill M. Co. has started work and has enough capital to keep going with a full force all summer. The work will mostly be developing the mine. The First Thought is working a full force of about 50 men. They are making regular weekly shipments both to Helena and to Butte. Rumor has it that this mine has been sold to a San Francisco syndicate, which Mackay controls. What lends color to this rumor is that its owner, Jonathan Bower, is in San Francisco on business connected with that mine. If that is true it will be a big thing for that district, for we need men of his energy and capital to make things lively there, and if Mackay is in it he will do that very thing. The La Una, in Mineral Hill, is going to start soon. Thomas Mason, of Tacoma, is the owner. Mr. Gil Chelson is preparing to ship a carload of high-grade ore out of the Silver Belt, to Butte. In Concomully, better known as Mineral Hill, they are doing very little now. The reason is that Mr. Allen Mason, who is heavily interested there has been away on a European trip. He has just returned and the Lone Star mine will at once start up with a full force of men. There is also some talk of the Lady of the Lake mine being worked this year. The Black Bear and War Eagle are two gold properties on Palmer mountain. A fine stamp mill is being built there and it will begin producing in 90 days. You see ours are large quartz ledges and the ore has to be reduced either by the milling or the lavation process. An immense amount of capital is necessary for the development of such ledges and also a continuous outlay for several years without any returns whatever. In this respect it differs much from the Cœur d'Alene mines where a man with small capital can work with some success. Another item of news is that we are going to build a flume four miles long from Salmon creek. This will give us a fall of 300 feet and 1000 horse-power. Power will thus be furnished for electric light and cars and also for running a tunnel into Ruby hill 300 feet long, the object being to strike the ledge 1850 feet underground. This will be completed in a year and then we will have greater depths to our mines than they have in Butte. The ledges are from 60 to 80 feet wide and the output practically unlimited. We must, however, have better communication than at present. Salt is a great factor in the reduction of our ores, and freight rates are now so heavy that they would eat up all the profits. But this difficulty will be soon remedied to a certain extent. The Canadian Pacific is building down to the Okanogan lakes at present, and they intend to run boats down to within 50 miles of the boundary line.

MECHANICAL PROGRESS

Electric Iron.

In July, 1880, Mr. James Barnett of Kentish Town, England, sent the following communication to *London Iron*. It was accompanied with an engraving, which we do not reproduce:

TO THE EDITOR OF *IRON*.—"There is nothing new under the sun," so it has been said. Meteoric—or electric iron—is not new, but what has been hitherto only seen of it has been made in the laboratory of the skies, dropping down to us from the rift clouds when thunder-stricken. In meteoric iron we are presented with the nearest approach to perfection in that metal which we can well imagine it to be capable of reaching. We are, moreover, shown therein something of what such a metal—the most useful and most abundant—can be made to do for us, provided that something like Nature's mode of producing the quality she can make be followed by man. The height of human endeavor has for its aim, if well directed, the limitation of Nature's processes, and success is in exact proportion to the nearness of approach accomplished by us in the direction of Nature's work. Simply stated, such samples of meteoric iron as have "come down" to us, present samples of what can be produced when electric action is employed.

In the production of iron, that material which is more largely than any other used in those industrial occupations upon which the mass depends for support and society for its advancement in material wealth, it must be of the highest consequence to adapt to its manufacture that "force," the volume of which is just beginning to be an open book, and the pictures in which are much plainer to the eye than the explanation of them are intelligent to the ear. Providing that electricity can be utilized by being brought within conditions sufficiently economical, and that those conditions can be made to apply upon a commensurately large scale, given these, and then the increase in the production of an invaluable metal becomes illimitable. The illustration given represents a sample of pig iron which has been subjected to electrical action.

My object in alluding to this particular specimen has been to prove the *bona fides* of the experiment, which is distinctly an instance of the practicability of producing electric iron, for here I show a piece of pig in the actual course of undergoing electrical action. I purposely arrested the process at a moment sufficiently early to preserve a dual condition of the metal acted upon. It is unmistakably a piece of pig, and upon the surface it is shown to be in the transitional stage of passing from common pig iron into a metal more highly refined than any that has ever before been seen, excepting when in the meteoric state.

The engraving as given in the paper from which we have quoted was made from a photograph and gives in quite full relief numerous ridges as of fibrous iron, giving the specimen an appearance of being in the act of being converted from an ordinary piece of cast iron into that of strongly marked fibrous iron. The sample, without explanation, would be a perfect riddle to any metallurgist. The paper above quoted concludes as follows:

It challenges attention toward the solution of one of the most important questions of the day. It defies dispute as to the fact of electrical agency having been successfully applied, and therefore makes its practicability a foregone conclusion. As to the question of its costliness, I may dispose of that satisfactorily by saying that, when the manufacture of electric iron is ready to be proceeded with upon a scale commensurate with the demand there will be for it, no iron besides will be able to compete with it for price.

We are not informed as to the manner in which the specimen was subjected to the action of electricity, but have introduced the article in this place merely as a prelude to the following process, which, perhaps may be considered a practical development of a process first suggested, as above, over ten years ago. We copy now from a late number of the *Electrical Review*:

Electrolytic Production of Pure Iron.

A process for the direct conversion of pig iron into wrought or ductile iron, without decarbonization by heat, has been invented and worked out into practical shape by Dr. Stephen H. Emmens, of Emmens, Pa., the inventor of the powerful explosive which bears his name, and is now most successfully going through the ordeal of government tests. Wrought iron, so called, is to-day most universally produced by the process of puddling cast or pig iron, the higher and costlier grades of pig being used, especially in the production of the finer brands, known as "Norway" and "Swedish" iron. The puddling process may be said to be simply the burning out of the contained carbon by the agency of heat and oxygen, and successful puddling requires great skill and extremely hard labor, which must be paid for accordingly. The Emmens process, as to the actual conversion, requires no heat and no skilled labor; but for

merchandiseable bar or sheet iron, the product is simply heated and rolled or hammered. The process is hardly to be described as decarbonization of pig iron. To coin a word for the purpose, "defecation" of pig metal would more accurately describe what takes place. The process is electrical and the pure iron is extracted from the crudest and most impure pig iron or pot metal with as much facility as from the best charcoal pig.

Many attempts have been made to force iron into the list of electrolyzable metals, but failure has marked all efforts except in the electroplating of engravings or copper electrotypes with a coating of hard iron. The difficulty has been completely overcome by Dr. Emmens, whose electrolyte and current treatment are such as to form a perfectly reguline and closely adherent cathode of iron of almost chemical purity, which then only needs washing, heating and rolling to produce an article equal to the finest Swedish iron, being very soft and easily worked. The inventor claims to be able to make the iron from pig, and put it into merchantable shape at a less cost than the ordinary puddling process, and at the same time to further cheapen the cost by using the very lowest priced grades of pig iron. If this be true, and there seems to be no reason why it is not, the effect can hardly be safely predicted. Electricity as a commodity is now a very cheap article, and its production is as certain and uniform as the laws of science can make it. It is said that the residue of the anode, composed of graphite, silicon, sulphur, phosphorus, etc., from which the iron is, of course, absolutely freed, makes a valuable basis for mineral paint, and probably this is the case.

The metallurgist will at once realize the value of this process, if for no other reason than that it at once makes available, for the production of iron, immense deposits of iron ore in various parts of the country which are now useless, owing to the prohibitive quantities of phosphorus and sulphur they contain. Such ores are not available even for the Bessemer or open hearth process, which produces low steels containing a very small proportion of carbon. But for the Emmens process these ores are practically as good as any. They can be melted, run into slabs of proper size and shape, and the only effect of the impurities is upon the character of the anode residue. The cathode will in all cases be practically and almost chemically pure iron. Not only that, but when heated and rolled or hammered, its quality is of the very highest grade. If, as seems to be fairly within the truth, such iron can be produced from such pig at a cost below or even the same cost as an equal quality by the puddling and refining processes, the result must be necessarily important in the future development of the iron industry.

The process is of interest also to the electrical fraternity in point of utility. The forged product is said to be surpassing in its fitness for magnet cores for all purposes, on account of its great purity and the low resistance of a magnetic circuit composed of it. This would seem to be true by comparison. The most impure cast iron has the least magnetic permeability, and the coefficient of the latter rises as the cast iron approaches the character of wrought iron. Swedish iron is the purest commercial iron we are acquainted with, and we all know its splendid magnetic-making properties when energized. The Emmens' iron, being still purer, ought to make a proportionately better electro-magnet. If it does, the electrical industries alone will create a heavy demand for the new product.

STEEL STAY BOLTS.—Steel, as a material for boiler stay bolts, is not meeting with the qualified success that has allowed the introduction of the same metal for the plates of the boilers themselves. More than one large railroad company has abandoned its use after an impartial trial, and returned to sligo, or some equally good brand of iron. The objection to the employment of steel is the great number of stays which break off, after a service of only a few months. In one boiler we examined recently, there were no less than 250 odd steel stay bolts broken, mostly in the throat sheet, and the front parts of the side sheets, after being in use nine months. The reason of this short life is undoubtedly the crystalline structure of steel, and the repeated bendings to which the stays are subjected, owing to the difference in expansion between the inner and the outer fire box sheets that they brace together. Several expedients have been tried with a view to obviating the destructive bending stresses, such as ball and socket joints for the stay bolt heads, etc., but nothing has yet been found to answer all the requirements. It is therefore safe to assume that as long as flat surfaces, stayed transversely by bolts, are employed in boiler work, just so long will there be trouble experienced with breakages—in other words, the evil is inherent.—*Progressive Age*.

COMPILMENTARY.—Sir James Kilsen's address in replying to the address of welcome given to European guests of the American Institute of mining engineers at the time of their recent reception at Pittsburgh closed with the earnest expression of his belief that the United States and England were necessary to each other in the interchange of products and brains, and he was convinced that "through such orderings Providence has designed to wind the silken chain of commerce round the world."

SCIENTIFIC PROGRESS.

Water and Temperature.

The changes in the temperature of water afford a very interesting study. In the form of ice the temperature may be 32° F., or lower, according to the temperature of the surroundings. Although the freezing temperature of pure water is 32° F., yet by observing certain precautions the temperature of the water may be reduced several degrees below this before congelation will take place; but in the act of freezing a certain number of units of heat are given out, due to the amount of work done in changing the form of the water. One pound of ice has a greater bulk than the one pound of water from which it was formed, because water is at its greatest density at a temperature of several degrees above the temperature of solidification. One pound of water in changing into ice will develop 140 heat units, and each unit of heat is equal to 772 foot pounds, it is evident that the freezing of one pound of water will develop a force equal to 108,080 foot pounds.

If the freezing was accomplished in one minute of time, an amount of energy equal to 3.27-horse power would be transformed. While the water is freezing this heat is given out, but that does not reduce the power required to bring about the change, for the heat has to be removed. But the removal of this amount of heat does not lower the temperature one degree, for although the water has been changed into ice, it still has the temperature of 32°. After the ice is formed, its temperature may be reduced to that of the surrounding air.

In changing ice into water, the same amount of heat is absorbed by the water as was given out during the freezing process, and the same amount of power in the form of heat will be required to produce the change; and although the ice is melted over a strong fire, the temperature of the water will not be raised above 32° until all the ice is melted, providing the water has a chance to circulate freely.

In water there appears a departure from the law of expansion and contraction, for in the case of water at a temperature of 39°, at which the water is at its greatest density, a change of temperature either above or below this will cause an expansion of the mass. As the temperature decreases from this point, it expands in nearly a regular manner, so long as the temperature continues to decrease. If heat is motion and produces motion in the atoms, and this motion causes expansion, then why is it that the abstraction of heat from ice causes the same phenomenon that in all other substances is the result of an increase of temperature. I know of no way to explain it, but it is a subject that has received a great deal of attention.—*Stationary Engineer*.

A Fly on the Wing.

There are many insects which one would little suspect to be furnished with apparatus suited to swift and more or less continuous flight. House-flies frequent the inside of our windows, buzzing sluggishly in and out of the room. But what different creatures are they when they accompany your horse on a hot summer's day. A swarm of these little pests keep pertinaciously on wing about the horse's ears; quicken the pace up to ten or twelve miles an hour, still they are there; let a gust of wind arise and carry them backward and behind, the breeze having dropped, their speed is redoubled, and they return to their post of annoyance to the poor horse even when urged to its fastest pace, says the *New York Ledger*.

But this example gives only a partial proof of the fly's power of flight, as the following will show: The writer was traveling one day in autumn by rail at about twenty-five miles an hour, when a company of flies put in appearance at the car-window. They never settled, but easily kept pace with the train; so much so, indeed, that their flight seemed to be almost mechanical, and a thought struck the writer that they had probably been drawn into a sort of vortex, whereby they were carried onward with but little exertion on the part of themselves. But this was soon disproved. They sailed forth at right angles from the train, flew to a distance of thirty or forty feet, still keeping pace, and then returned with increased speed and buoyancy to the window.

To account for this, look at the wings of a fly. Each is composed of an upper and lower membrane, between which the blood-vessels and respiratory organs ramify so as to form a delicate network for the extended wings. These are used with great quickness, and probably 600 strokes are made per second. This would carry the fly about twenty-five feet, but a sevenfold velocity can easily be attained, making 125 feet per second, so that under certain circumstances it can outstrip a race-horse. If a small insect like a fly can outstrip a race-horse, an insect as large as a horse would travel very much faster than a cannon-ball.

LIFE OF LICHENS DURING WINTER.—Of all plants, lichens are the ones that most easily endure the lowest temperatures. They are met with in profusion in the polar regions and at the highest altitudes, where no other plant can subsist. The causes of this peculiar resistance being unknown, Mr. H. Jumelle decided to ascertain how, from the standpoint

of gaseous exchanges with the atmosphere, the lichens of our country behave during the winter. The study of this point was evidently capable of throwing light upon the question of the resistance of these plants. The results obtained by Mr. Jumelle and recently communicated to the Society of Biology, are as follows:

In our country, when the temperature descends below zero, lichens enter upon a retarded course of life due less to the lowering of the temperature than to a loss of water. In lichens that grow under shelter and on the ground, the loss of water being less, the gaseous exchanges will be merely decreased, and remain sensible. On the contrary, in lichens living upon trees and exposed to the air, desiccation occurs to a considerable extent, and life is then so retarded that, in darkness as well as light, the gaseous exchange no longer becomes appreciable. If, by chance, the lichen contains a notable proportion of water, the freezing of the latter produces an effect analogous to that of desiccation, and the gaseous exchanges are again of the feeblest character.—*Revue Scientifique*.

The Eyes of Deep-Sea Fish.

The queerest thing about deep-sea creatures is their arrangements for vision. Fish that live at very great depths have either no eyes at all or enormously big ones. Indeed, there are two ways you may get on in these gloomy abysses, by delicate touch organs, or by sight that collects the few rays of light due to phosphorescence or other accidental sources. Now, as we go down in the water we find at each depth that the effects produced upon the eyes of fish are steadily progressive in one direction or the other. Species that live at a depth of eighty fathoms have the eye already a good deal bigger than their nearest representatives that live at or near the surface. Down to the depth of 200 fathoms, the eyes get constantly bigger and bigger. Beyond that depth small-eyed forms set in, with long feelers developed to supplement the eyes. Sight, in fact, is here beginning to atrophy. In the greatest abysses the fish are mostly blind, feeling their way about entirely, by their sensitive bodies alone, over the naked surface of rock at the bottom. Some of them have still external relics of functionless eyes; in others, the oldest and most confirmed ahyalal species, the eye has altogether disappeared externally, though its last representative may still be recognized imbedded deep in the tissues of the head.

But many deep-sea fishes have a curious system of hollows in the skull, or along a line on the body, which secrete mucous or slime, and this slime often envelopes them completely, as in a sheet of jelly, from head to tail. Strange to say, it is phosphorescent. Moreover, many other deep-sea species have two sets of organs buried in their skin, consisting of round, shining, opalescent bodies, very closely resembling mother-of-pearl. One sort is large and oval and is placed on the head not far from the eye; the other kind is smaller and arranged in a series along the body and tail, a pair usually answering to each joint of the backbone. All of them are abundantly supplied with nerves, and they seem to be organs for the production and perhaps also for the perception of phosphorescent light. If so, we may suppose that each such fish goes about like a string of glow worms, or a train of lighted cars, all the organs along his side or tail shining faintly in the dark, somewhat after the fashion of luminous paint. Dr. Gunther suggests that in certain cases the phosphorescence may be produced in a sort of back chamber of the organ, and then emitted in particular directions through the lens in front, precisely as a policeman flashes his hall's eye on any suspected point.—*The Cornhill Magazine*.

THE EARTH'S AXIS.—Two weeks ago we gave an item in this column in regard to a recently observed variation in the earth's axis, which was attracting much interest among scientists in Europe. Since that time we notice that a movement has been set on foot in this country to investigate this phenomenon under the auspices of the International Geodetic Association. Observers in general have been requested to make simultaneous observations during a given space of time, and, in addition, eminent scientists will make observations in different parts of the world. Mr. Preston, on behalf of the United States Coast and Geodetic Survey, will establish a station on the Hawaiian Islands; Prof. Marcuse, on behalf of the European scientists, will occupy a station on one of the South Pacific Islands, and Prof. Deviden will conduct his observations at the Astronomical and Longitudinal Station in Lafayette Park in San Francisco.

PHOTOGRAPHING UNDER WATER.—Mr. Masey has succeeded in photographing the movements of fishes under water, taking proofs at the rate of 50 a second with exposures from 1-2000 to 1-3000 of a second. A set of 12 photographs gives all the phases of the undulations which the medusa impresses upon its umbrella of a locomotor apparatus. Another series exhibits a squid leaping out of the water. A rag has also been taken in profile while waving the edge of its flat body, and the curious mode of progress of a comatula has been taken.

THE CON. CALIFORNIA AND VIRGINIA MINING CO. is not affected much by the discount on silver. More than half of the bullion product last month was gold.

ELECTRICITY.

"The Storage Battery."

Electricity, like water, depends for its power of doing work on two conditions: quantity and force; its potentiality increases according to the place where it is produced as compared with that at some other place. The difference of potential corresponds with the difference of pressure in gases, with the difference of temperature in heat. As the sea level is the standard for measuring the height of a mountain, so are electric levels measured from the arbitrary level of the potential of the earth.

A storage battery does not store electricity any more than the spring of a clock can be said to store time or sound; it stores energy. The energy of an electric current is used to produce a decomposition of metal of such a nature as will of itself produce a current on the removal of the original current. The accumulators are two plates of metals immersed in a liquid acid which is called the electrolyte, and which cannot act on the plates except while an electric current is passed through it, which effects its decomposition in depositing its positive and negative constituents on the two plates. On the cessation of the current the cells are discharged by a connection outside the liquid, in the opposite direction. Plates of compressed litharge have been recently used, and many experiments are being made in the hope of obtaining such results as will avoid the necessity of using a dynamo. Electric meters are those in which a portion of the current passes through a solution of a metallic salt, and the strength is determined by the amount of electrolytic decomposition it effects. There is also an electro-thermal meter to measure the heat caused by a certain resistance, or by the amount of a liquid evaporated by the heat generated by the current; and an electromagnetic meter, in which the current is measured by the magnetic effect. It proceeds upon a needle by deflecting it.—*Exchange.*

ELASTIC ACCUMULATORS.—A novel form of accumulator has just been produced by M. Emile Reynier. This battery affords in a simple compact structure a high voltage, and at the same time improved modifications for securing additional solidity and transportability. The essential advantage of this battery consists in its possessing a certain amount of elasticity from its peculiar construction. It has sixteen plates mounted in flexible pockets, and these elements are placed flat, one against the other, and compressed between two end plates of wood by means of rubber spring bands. This spring arrangement gives to the active solid matter an artificial elasticity which results in large specific power and storing capacity. This is only one of the many important improvements which have recently been effected in the storage battery, and which are gradually bringing that mode of generating electricity to a stage of perfection which will lead to its general adoption for propulsive and other purposes.

ELECTRIC WIRES ON ROOFTOPS.—United States Circuit Judge Sawyer has decided that the municipal ordinance prohibiting the placing and maintaining of electric wires on the roofs of buildings is valid and constitutional law. Soon after the ordinance was passed, Chief Engineer Scannell of the Fire Department began to cut down some of the wires of the Electric Improvement Co. The company filed two actions in the Circuit Court against the City and County of San Francisco and Chief Scannell. The company wanted to restrain and enjoin the Board of Supervisors and the Chief Engineer from carrying out the provisions of the ordinance. Judge Sawyer decided that the supervisors have a right to pass laws for the protection of public interests and the safety of the community, even when private interests are injured. The injunction was dissolved. The decision was rendered in the action against the city, but the same applies to the case of Chief Scannell.

THE UTILITY OF THE ELECTRIC LOCK.—Dwellings and buildings of all kinds are now rendered secure with greater facility than ever by means of the electric lock. By the use of this lock, which can at any time replace the lock ordinarily used, the entrance doors of private residences, apartment houses, offices, banks, etc., can be absolutely controlled by a person in another part of the building. The pressure of a button located at any desired point, closes the circuit, and the current passing through the magnet inside the lock, releases a lever. The spring then throws back the bolt, and the opposite knob can be turned and the door opened. In apartment houses the button (one for each suite) is placed near the speaking tube, which runs to the outside door.

SIGNING A CHECK BY ELECTRICITY.—One of the marvels of electricity, and one of the most striking of the Edison exhibits at the Paris Exposition, was the little instrument which enables the operator to sign a check 100 miles distant. The writing to be transmitted is impressed on soft paper with an ordinary stylus. This is mounted on a cylinder, which, as it revolves, "makes and breaks" the electric current by means of the varying indentations on the paper. At the receiving end of the wire a similar cylinder, moving in accurate synchron-

ism with the other, receives the current on a chemically prepared paper, on which it transcribes the signatures in black letters on a white ground.

ELECTRICAL WORK IN FRANCE.—Various new applications of electricity are reported from France. It is said that the government military workshops at Mendon are now quite busy with the manufacture of electric motors for the use in ballooning in time of war.

THE BUILDER.

ARCHITECTURE IN CALIFORNIA.—The American, says a correspondent of *Harper's Magazine* have not the art of making houses or a land picturesque. The traveller is enthusiastic about the exquisite drives through these groves of fruit, with the ash or the snow-covered hills for background and contrast, and he exclaims at the pretty cottages, vine and rose clad, in the semi-tropical setting, but if by chance he comes upon an old adobe or Mexican ranch house in the country, he has emotions of a different sort. There is little left of the old Spanish occupation but the remains of it to make the romance of the country, and appeal to our sense of fitness and beauty. It is to be hoped that all such historical associations will be preserved, for they give to the traveller that which our country generally lacks, and which is so largely the attraction of Italy and Spain. Instead of adapting and modifying the houses and homes that the climate suggests, the new American comes here brought here from the East the smartness and prettiness of our modern nondescript architecture. The low house, with recesses and galleries, built round an inner court, or patio, which, however small, would fill the whole interior with sunshine and the scent of flowers is the sort of dwelling that would suit the climate and the habit of life here. But the present occupiers have taken no hint from the natives. In village and country they have done all they can, in spite of the mesquite and the cactus and the palm and the umbrella tree and the live oak and the riotous flowers and the thousand novel forms of vegetation, to give everything a prosaic look. But why should the tourist find fault with this? The American likes it, and he would not like the picturesqueness of the Spanish or the Latin races.

SAFE ROOF BUILDING.—Vice-President Atkinson of the Boston Manufacturers' Mutual Insurance Company, in an address recently delivered before the Architectural Club of Boston, made some pertinent suggestions concerning the construction of roofs, in effect as follows: The true principle is—first, to understand what purpose is desired in the building proposed, and to build to that purpose. He would reverse the ordinary methods of building, and would plan the roof first. The purpose of the roof is not merely to keep out the rain, but it should also keep out weather changes; keep off fire, etc. The ordinary roof meets none of these points. The modern roof, such as the great fire in Boston, was described as a structure of light wood and felt, covered with slate. The slate cracks easily under either heat or cold, admitting rain, attracting heat and inviting conflagration. He said then some of the very best roofs are over the oldest factories, with solid frames, matched boards, covered with lime mortar, upon which the shingles were laid. There were no shingles laid on boards to decay quickly and kindle readily. His ideal roof would be nearly flat—an entirely flat roof will shed rain. That it will collect snow is not a criticism, for a roof should be as strong as the floors. Under any circumstances not over a foot of solid ice could accumulate, and any decent roof could bear that. Roofs of the barn style, mansard, etc., are denounced by underwriters as inviting destruction by fire. He would have no hollow cornices, for the same reason. The best way is to pitch the roof of industrial buildings toward the center, with only a pitch of half an inch to a foot. This carries the water away through a channel not exposed to frost, and admits of much better advantages of light in the upper story. The use of parapets was commended as especially desirable. He gave as the average cost of a factory building 75 cents per square foot of flooring, in buildings of two or more stories in height. For some reason a flat roof is objected to in a country house, but when the use of the house is considered, the advantage of the flat roof will appear.

BLOCKS OF COMPRESSED WOOD AS A SUBSTITUTE FOR BRICKS.—If we may believe German journals, brick and terra-cotta are no longer to stand alone as the best fire-resisting building materials. A new hotel, which has just been put up at Hamburg, is described as being built entirely of blocks of compressed wood as hard as iron, and by subjection to certain chemical processes rendered absolutely proof against both fire and the attacks of insects. If the claims of the inventor are well founded, he is clearly wasting time in the Fatherland, and should come over to us with his invention without delay and reap the reward of his labors. A process for making wood fire proof is just one of those things which American builders have been banking after for some decades past.

SOMEBODY has said that railroad companies seem to have the power of hypnotizing Legislatures by simply making passes.

GOOD HEALTH.

TO RELIEVE AN OVERWORKED BRAIN.—A Swiss doctor says that many persons who extend their mental work well into the night, who during the evening follow attentively the program of a theater or concert, or who engage evenings in the proceedings of societies or clubs, are awaked in the morning or in the night with headache (the *Sanitary Inspector*). He is particular to say that he does not refer to that headache which our Teutonic brethren designate *Katzenjammer*, that follows certain convivial indulgences. This headache affects many persons who are quite well otherwise, and is due in part to the previous excessive work of the brain, whereby an abnormal flow of blood to that organ is caused; in part to other causes, for example, too great heat of rooms, contamination of the air with carbonic acid, exhalations from human bodies, and tobacco smoke. For a long while the doctor was himself a sufferer from headache of this kind, but of late years has wholly protected himself from it by simple means. When he is obliged to continue his brain work into the evening, or to be out late nights in rooms not well ventilated, instead of going directly to bed, he takes a brisk walk for half an hour or an hour. While taking this tramp, he stops now and then and practices lung gymnastics by breathing in and out deeply a few times. When he then goes to bed, he sleeps soundly. Notwithstanding the shortening of the hours of sleep, he awakes with no trace of headache. There exists a clear and well-known physiological reason why this treatment should be effective.

THE REAL CAUSE OF DEATH.—The most common cause of death is fat and lime. Microbes are mere accessories in causing death. Take myself as a case in point. Once, when younger, I could lift my leg on a level with my head, writes a doctor in the *St. Louis Globe-Democrat*. It is an effort for me now to get it half that distance. Lime deposits are the cause of it. It is only a few days since that I performed a post-mortem on the remains of a distinguished journalist who died in this city at an advanced age. When I reached his heart I took my knife and on rubbing it over that organ it sounded as if it were being rubbed over a rough stone. The heart was fairly encased in lime. I have now under my care a distinguished literary man—a nonagenarian. He is going to die. (The patient has since died.) His death will be caused by abnormal deposits of lime. There is no mystery in death. It is as natural for man to die as to be born. We are born, we develop, we grow ("grow" is right) and we die. Is there anything strange about that? Man is like a tree. He lives his time, then withers, decays, dies. When we shall have learned everything we shall be wise enough to prolong the life of man, but by reason of the materials of which the body is composed he must die.

CANCER AND SMOKING.—Since the death of President Grant, a constant smoker, cancer of the tongue and cigar smoking have been closely associated in the public mind. Surgeons of experience find that the disease is far more frequent in persons who have been in the habit of smoking. The disease appears to be about six times more common in males than in females. The affection known as "smoker's patch" is common. It is a slightly raised oval area on the forepart of the tongue, a little to one side of the middle line, just where the end of the pipe rests, or where the stream of smoke from the pipe or cigar impinges on the surface of the tongue. The patch is usually red, but it may be bluish or pearly white. It lasts for years, but tends to spread over the surface of the tongue if the irritation be continued. When diffused in this fashion, it constitutes leucoma of the tongue. Leucoma is certainly a predisposing cause of cancer. The smoker should never leave a "patch" untreated, and should avoid rough mouthpieces and brands of tobacco which cause irritation of the tongue.—*Sci.*

NATURE'S TRUE TONIC.—One of the advantages of light gymnastics is that the sick and convalescent can make what appear to be trifling efforts, and by them, in time, be restored to active health. If too feeble to be practically able to make but little exertion, try what are known as deep-breathing movements. Lie flat upon the back, take as long and as deep breaths as possible, and while the mouth is closed, slowly throw the arms up in front and then at the sides. Rest for ten minutes. Try again the same inhalation and exhalation of air, the latter being pure and fresh. After a while attempt the same, sitting up. These exercises can safely be taken by the sick one, every day, several times, and the whole muscular system will be improved, just as if some revivifying tonic had been given, a far better one than any charged with alcohol or some like stimulant.—*Ladies' Home Journal.*

CARBOLIC ACID FOR BOILS.—A German medical journal asserts that incipient boils may be readily cured by the injection of a three-per-cent solution of carbolic acid. In order to effect a radical cure and prevent suppuration, the injection must be made early. If a boil has already begun to discharge, the only effect of the injection will be to hasten the cure and prevent the formation of deep scars.

USEFUL INFORMATION.

How to Make Large Soap Bubbles.

Children, and others, as well, may learn how to prepare a mixture for making the largest kind of soap bubbles, from the following receipt furnished by *St. Nicholas*.—Next to white castile, the mottled castile gives the best results. The soap being obtained, a friendly druggist must carefully weigh out 60 grains (for exactness in proportions is needful) for each ounce of water. That is, one drachm (according to the apothecary's weight of the old arithmetic), and when the weighing is done, and the obliging druggist thanked for kindness, the rest is plain sailing. A bottle with a sound cork is the next requirement. It must be large enough to hold three or four times the quantity of solution you wish to make. Do not prepare too much at one time; two ounces of soap solution will be a good quantity, and for this a six or eight ounce bottle will be the right thing. The bottle must be well cleansed and then well rinsed out with soft water—which, by the way, should be used for all the operations. All being ready, the soap is cut into fragments small enough to enter the bottle. Measure an ounce of water for each drachm of soap; this can be done with a teaspoon, eight spoonful making an ounce. Having poured the water and put the soap into the bottle, we have now to await perfect solution, which will happen in the course of two or three hours, if the bottle be put in a moderately warm place. Then add glycerine to the soap solution, the quantity varying with your ambition. I have found that one-half the volume of the solution gives excellent results; that is to say, to each ounce of water add one-half ounce of glycerine, measuring the quantities instead of weighing them in both cases. The bottle is now to be tightly corked and well shaken; then set aside for two or three hours more, and well shaken again. These alternate periods of rest and agitation should continue for a whole day. Finally, let the bottle stand undisturbed and tightly corked for twenty-four hours. Bubbles of great size and beauty may be blown with this solution.

IRON ALLOYS.—The remarkable success which has rewarded the researches of inquirers and experimenters on the alloys of steel with chromium, tungsten, aluminum and nickel gives good reason to continue exploration of this field. Among these alloys the most important results appear to have been obtained from the use of nickel as an alloy of steel. Iron alloyed with silicon and also with aluminum have many points of resemblance. But when the addition of 15 per cent of aluminum—the minimum amount which has been found efficient implies an addition of something like four dollars per ton to the cost, its employment in competition with silicon as "ferro-silicon," or "silicon speigel," cannot be considered as more than experimental.

A CEMENT that is said to be strong enough to stick anything may be made as follows: Take two ounces of gum-arabic, one and a half ounces of fine starch and half an ounce of fine sugar. Pulverize the gum-arabic and dissolve it in as much water as the laundress would use for the quantity of starch indicated. Dissolve the starch and sugar in the gum solution. Then cook the mixture in a vessel suspended in boiling water until the starch becomes clear. The cement should be as thick as tar and kept so. It should be kept from spoiling by dropping in a lump of gum camphor or a little oil of cloves or sassafras. The cement is extremely strong, and will stick perfectly to glazed surfaces.—*Builder and Woodworker.*

WEALTH IN SEWAGE.—The city of Worcester, Mass., has probably the best arrangement for an economical disposition of city sewage of any other city in the world. After considerable experiment the system is now considered as demonstrated to be an unqualified success. The sewage is collected in large tanks, and when the work of chemical precipitation has been accomplished, the effluent, which is discharged into the Blackstone river, is so pure that chemists say it might be drunk with safety. The system is in use in European cities, and the general verdict there is that its efficiency is unquestioned and its administration economical.

COMPOUND BELTING MATERIAL.—The substitution of camel's hair, cotton, paint and chemicals for leather in machinery belting is meeting with some success in this country. The invention was first perfected in England, where it was received with much favor. It is claimed for the new material that it is stronger than other belting, more durable under strain, more efficient and as low priced, and therefore cheaper in the end.

A PASSENGER CAR without end platforms has been patented by Mr. E. H. Beckley of Elkhart, Ind. At each end of the car are side doors at the bottom of the ordinary steps, the doors being flush with the side of the car and opening inward. The steps may be covered by a trap-door while the train is running. In the end of the car is a door and vestibule arrangement affording communication between the cars.

THE waters of the Seine river, France, have been restocked with 40,000 California salmon.



A. T. DEWEY.

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W. B. EWER, SENIOR EDITOR

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SAN FRANCISCO:

Saturday, April 18, 1891.

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[NEW THIS ISSUE.]

Assessment Notice—Carmelo Land and Coal Company. Gold Mine Wanted—Reliable, New York. Concentrators and Pumps—Kieson Iron Works. Blowing Engine—James Leffel & Co., Springfield, Ohio.

See Advertising Columns.

Passing Events.

Ex-Governor Waterman, whose death is chronicled this week, was as prominently identified with the gold and silver mining interests of California as any man in the State. He was the owner of several productive mining properties in the southern part of California, and a man who was a natural prospector and minor, investing his money freely and developing claims which looked to him promising. To him, more than any other, is due the development of Calico district, San Bernardino county, and the revival of the mines around Julian, San Diego county.

The city is busy with preparations for the reception of the President of the United States, who will remain here and in the vicinity for about a week. On his way here he will visit the prominent points in Southern California.

The discovery of a flow of natural gas at Pleasanton, Alameda county, has caused some local excitement. It is not very strong as yet, but gives promise which has aroused the enthusiasm of the residents. This is only one of several places where natural gas has been found in this State.

The labor troubles in this city still continue, and the building trades are considering the advisability of assisting the molders by refusing

to work on buildings where iron from non-union shops is used. The shoe factories have closed down, throwing a great many out of employment. The situation is discouraging to those who have made investments in local producing industries.

Electric Car Wires.

The supervisors of this city have finally passed an ordinance prohibiting the suspension of electric wires from poles for the purpose of operating cars along the public streets of San Francisco. One company had already spent \$50,000, put up 250 poles on East street, and contracts had been let for upward of one million dollars. The road was to run from San Francisco to San Mateo, 21 miles. The North Beach & Mission Railway also had intended to put in an electric plant. As the 300 electric street railways which have been built in the United States are, with but two exceptions, operated by the overhead wire system, the passage of this order virtually excludes electricity as a motive-power for street-cars in this city, there being no other available practical system.

Arguments were made by the interested parties in favor of the electric roads, but the supervisors considered the poles unsightly and the wires unsafe, so the order was passed.

It will be remembered that the State law was changed recently so as to permit the use of electricity as a motive power on street railroads, but each municipality is empowered to grant or refuse franchises for such roads. Several are being built in and around Oakland and other cities have them in view.

Up to quite a recent date the history of these roads in this State is an unfortunate one. Several were failures and most of them were really built to aid real-estate speculators, and, the property being sold, they were abandoned. As compared with cable roads they are very cheap to construct and equip, but as to comparative cost of operation when finished that is an open question still. The large cities using them are by no means satisfied with overhead wire railroads, notwithstanding the statements to the contrary. For smaller places and suburban localities they answer the purpose very well. In large cities there are several objections to this system and these objections were considered weighty by the Board of Supervisors; hence the passage of the prohibiting order.

The Mechanics Institute Fair.

The Board of Trustees has decided that the 26th Industrial Exposition of the Mechanics Institute shall open on Tuesday, August 18th, and continue until September 26, closing on the evening of that date. The management desire particularly that the arts, industries, new inventions and natural products of the Pacific Coast be well represented, and no pains will be spared to make this class of exhibits a special feature.

The promenade avenues are to be broadened and 4500 seats provided for the comfort and convenience of visitors. Ample motive power, including steam and water, will be provided and furnished in reasonable quantity free to exhibitors, and also special facilities afforded for the testing and operation of new machines and inventions.

Premiums in the form of medals, diplomas and cash will be considered; a band of 50 pieces will furnish music; there is to be a first-rate cafe, and several new and attractive features for amusement and instruction of visitors will be introduced. The management believe the attendance will be greater than at any former fair, making the occasion an exceptional time and place to bring to the notice of the public new inventions, manufactured products, processes and appliances. Exhibits will be received from August 10th to 16th inclusive.

ARTHUR MACY, Manager and Superintendent of the Standard Con. Mine of Bodie, died at San Rafael on Tuesday. Mr. Macy was about 40 years of age, and was a graduate of the Columbia School of Mines. As Superintendent of the Silver King mine in Arizona in its palmy days, he gained quite a reputation. Afterward, as Superintendent of the Standard Consolidated mine, he became even better known. He was very successful in treating the ore of Bodie district.

The President's Visit.

Only once before has a President of the United States, while still clothed with the insignia of that high position, reached our distance from the National Capitol. We have had visits from ex-Presidents and have shown them honors worthy of their public services. President Hayes alone found his way to California while still in office. President Harrison will be the first of all the Presidents to visit the States of Oregon and Washington.

It is but natural that the coming of the chief officer of the republic to our shore should awaken the keenest interest and arouse enthusiasm. Hero worship has prevailed since the beginnings of the race, but in these later days we have come to characterize our deference to those in authority with a wider significance than pertains merely to devotion to the person of the sovereign. We rally to welcome the President as a worthy and honorable citizen, but beyond that our wealth of loyalty and devotion is poured out not upon the man but upon the office which he graces—the headship of our beloved nation. Let not, then, there be any disposition to glorify the coming of President Harrison for fear of sharing the abject devotion which pleased the vanity of the despot. We shall honor Harrison as the embodiment of the American idea and the representative of American greatness. As we believe in that idea and as our patriotism rises into fervor as we contemplate the grandeur of our nation, we cannot refrain from honor to our visiting President. It is but fitting, then, that we show him welcome, hospitality and the fullest goodwill. It is proper that all thought of partisanship should be banished from the popular mind. We honor our institutions and ourselves and we show to the world our faith in them when, as dwellers upon the far-away Pacific, we bestow the highest civic honors upon the visiting chief executive of the nation and demonstrate the fact that though 3000 miles from the nation's heart, the patriotic current is warm and strong and powerful for national unity and harmony.

The President's party is made up as follows: President and Mrs. Harrison, Mrs. McKee, Mrs. Olmick, Postmaster-General Wamaker, Mr. and Mrs. Russell Harrison, Private Secretary Halford, Mr. and Mrs. George W. Boyd, Mr. Tibbitt, the President's stenographer, and several representatives of Eastern newspapers who will accompany the party.

The special train bringing the party is expected to touch California soil at Fort Yuma in the morning of Wednesday, April 22d. It is probable that Governor Markham, Senator Felton and other officials will meet the President at the State line. The following is the itinerary of the California visit:

Arrive at Los Angeles Wednesday, April 22d, at 3 P. M.; arrive at San Diego Thursday, April 23d, at 7:30 A. M.; arrive at Pasadena Thursday, April 23d, at 4:30 P. M.

Leave Los Angeles Friday, April 24th, at 10 A. M.; arrive at Santa Barbara Friday, April 24th, at 2 P. M.

Leave Santa Barbara Friday, April 24th, at 12 o'clock midnight; arrive at San Francisco Saturday, April 25th, at 7:45 P. M.

Sunday, Monday and Tuesday in San Francisco. Leave San Francisco Wednesday, April 29th, at 9 A. M. for Palo Alto.

Leave Palo Alto on evening of Wednesday, April 29th, stop at San Jose and then run through to Santa Cruz.

Leave Santa Cruz Thursday, April 30th, at noon for Monterey; Thursday afternoon and Friday forenoon at Monterey; arrive in Oakland (via San Jose and Niles) Friday afternoon.

Saturday and Sunday in San Francisco.

Leave San Francisco Monday, May 4th, at 2 A. M.; arrive at Sacramento Monday, May 4th, at 6:30 A. M.

Leave Sacramento Monday, May 4th, at 10 A. M., for Portland.

Great preparations are being made for the reception and entertainment of the presidential party in San Francisco. As stated above they will arrive on Saturday and will pass a quiet Sunday.

On Monday there will be a reception to the Governor and staff officers, municipal officers, army and navy officers, consuls, members of the Chamber of Commerce, etc. In the afternoon, from 2 to 5 o'clock, the President will drive through the Park to the Cliff House.

On Tuesday he will participate in an excursion on the bay and visit harbor fortifications. He will be tendered a banquet on Saturday evening, May 2d, after his return from Monterey.

An Ancient Amalgamator.

In looking up the subject of amalgamators, many interesting particulars and devices are to be met with, among which is a patent specification taken out in England in 1783 by Charles, Baron de Chastel, citizen of Geneva. This old machine is on the principle of the older Mexican arsetra and Ohile mill, and really, it is a matter of doubt if there is to-day a better amalgamator than this ancient one, which is described in Florence O'Driscoll's "Notes on the Treatment of Gold Ores," published by John Wiley & Sons. A few extracts from the specification may be of interest. It is set forth "that he, the said Charles, Baron de Chastel, should and lawfully might make, use, exercise and vend his 'New Constructed Machine for Separating Gold and Silver from Earth, Scoria and Impurities, by means of Trituration, Mercury and Amalgama,' within that part of Great Britain called Eogland, the Dominion of Wales, and the Town of Berwick-upon-Tweed.

The specification then continues:

The Baron de Chastel will not confine himself to a specification which tends to move the machine to be constructed; it is a matter absolutely arbitrary, depending upon the locality where the establishment is to be formed; and he thinks that the plans will sufficiently demonstrate of themselves the means that he has made use of. Neither will he limit himself in the manner in which he has laid down the powers of motion. It may be produced by the arms of a man, by means of water, fire, wind, or by the power of a horse, etc. It imports little how it is produced, provided that the means made use of are sufficiently powerful. He will neither specify in what manner the water may be procured; that also is arbitrary. It may be effected by river or rivulets, which, by means of small pipes, may supply the water that may be wanted. In towns, where every house is supplied with water, it will be easy to obtain a sufficient quantity to proceed in the course of that operation which this machine requires; wells may be sunk, pumps, etc. It is easy to comprehend how superfluous it would be to specify all those articles which are absolutely arbitrary, and which enter in the principal of this invention only as collateral matter. Here it is, then, that the Baron de Chastel thinks, only necessary to specify:

Figure 27.

a, brickwork; b, joists and platforms; c, cast-iron basin; d, freestone newett; e, freestones which surround the basin; f, exterior canal out in the said stone; g, mills of cast iron and their trees, the pivots of which are supported in the center; h, wooden circle with its laths; i, iron arm which conducts the mills; l, tree and lantern; m, black tin basin fixed upon the lantern; n, pipes which carry the water into the said basin; o, pipe fixed to the basin m, which carries circularly the water upon the nut d during all the time of the work; p, oblique aperture in the basin of iron; q, oblique aperture in the freestone e; r, a little vault in the said stone to enable it to reach the basin i to draw off the amalgama; s, small basin of freestone; t, concavity in the said basin; u, perpendicular aperture in the said basin; v, canal for carrying off the water into the reservoir, Fig. 28.

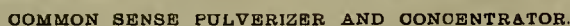
Figure 28.

a, brickwork which serves as an inclosure to the reservoir; b, octagonal carpenter's work which supports the freestones c; c, freestones or water conduit; d, large lavigator with its bottom; e, second lavigator without bottom with its laths; f, large cast-iron plate concave in the center, laid on the bottom of the lavigator d; g, cast-iron broyard; h, little cast-iron casement; i, lever to move the broyards; k, cross-piece, which supports the axle tree; l, canal for carrying off the waters and to rid the building of the mud; m, space around the lavigator; n, aperture for drawing off the water from the lavigator or reservoir.

The particulars given in the specification are as to the material, manner of construction, and general remarks about the machine; it is unnecessary to reproduce them, as the reproduced essential parts of the drawings give ample particulars. Excerpts from directions concerning procedure are as follows:

The water which incessantly, during the operation, runs circular on the side newetts, successively carries off the ashes or sands with

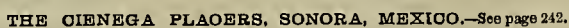
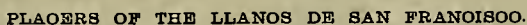
Fifth Operation.—When the water is clarified, the amalgam is drawn off by taking away



Sixth Operation.—When it is intended to draw from the great reservoir all the particles that may have escaped from the machines, you will proceed in the following manner: You will supply and clarify the water by turning

retort is customary, and does not enter into the principle to be explained of this new invention.

The Baron de Chastel, after having taken great pains in the researches he has made, after



the spigot, Fig. 1, letter *c*, which closes the aperture of the cast-iron hason. The amalgamized mercury is received into a portable hason; you empty the water of the hason into the little hason, Fig. 27, which passes through the canal into the reservoir, Fig. 28; if any other part amalgamized escape, they precipitate themselves in the concavity of the little hason, Fig. 27. In short, if any of the rich particles escape, they are carried off into the reservoir.

the hroyards all the while; then you will open the aperture marked *n*, Fig. 28, in order to draw off the water, and what remains at the bottom must be taken up with sponges; then the amalgamized mercury, with gold and silver, which will be drawn off at the bottom, must be passed through the skin, as well as that of the machines, in the usual and known manner, to be afterward passed through the report. Remark, this operation of the lam and

having been at great expense, together with his father, to detect all the errors of the ancient mills, which caused so great a loss of precious matter, after having made different trials and different pursuits and experiments upon this subject in the Republic of Geneva, has at length succeeded in the construction of this machine, which promises very considerable advantage. After its first construction made at Geneva, he has still made new trials

and improvements upon this invention, and has made considerable additions and improvements and essential corrections, of which he here has given a specification, so that he believes that this machine is now actually in a very high perfection.

The foregoing drawings and particulars of Baron de Chastel's machine are given principally to show how little advance has been made in this direction during the past 100 years.

This machine has proven successful in several places where used. For all free wash and moderately hard cement it does good work, and must effect a great saving in working such material, owing to the small head of water required. The automatic rejection of all rocks and material by the revolving screen makes the handling of the gravel cheaper, as all hand culling is rendered unnecessary. With from four to six miners' inches of water, 100 tons can be worked every 24 hours. This machine is in use in several places in the State, and represented to be giving satisfaction. There is a wide field for it in the central and northern part of California and Southern Oregon, as well as in other places.

Pulverizer for Auriferous Gravel.

On this page is shown the "Common Sense" pulverizer and concentrator for working auriferous gravel, cement, clay, etc. It does not crush the rocks, but washes them clean, while at the same time it pulverizes the cement or clay and saves the gold, even those particles which are fine.

The machine consists of two iron troughs or "concaves," each 26 inches in diameter, one of which is about 18 and the other 12 feet long. In these troughs are strong revolving shafts with projecting teeth made of steel, two inches wide by three-quarters of an inch thick, placed in spiral form around the shaft about two inches apart, forming a conveyor.

The first shaft is arranged to revolve from 150 to 250 revolutions per minute, and the second one from 300 to 500. There is a revolving screen between the two troughs that takes out the coarser rocks after being washed, and only the finer material runs into the second trough, and is there worked thoroughly.

There is a space of about four inches in the bottom of each trough, or "concave," that fills up with gravel and sand. When the gold is freed it settles into this, and as the teeth do not disturb the bottom, the gold remains there until a cleanup is made.

The concentrating pan shown is used for cleaning up or prospecting where the material does not need breaking up. It is 8 feet long and 2½ feet wide.

The Employers' Federation.

A Federation of Employers is in progress of organization in this city, which will include the foundrymen, ship-owners, lumber dealers, box-makers, huddlers, harness and leather-makers, etc. The idea is to form a federation of employers of the Pacific Coast on the same plan and to be just as extensive as the organization of trades unions in the Council of Federated Trades, with its sub-federations in all parts of the coast, so that, no matter in what trade or locality the Council of Federated Trades might exert its power, it would meet an equally compact organization to oppose its decrees. It is not proposed to attempt to destroy trades unions, but to restrain them and to resist unreasonable demands; nor is it desired to reduce wages, but to so arrange matters that employers shall not be dictated to as to the individuality of employes. A committee is to be appointed, selected from the different industries, which will constitute a court of final appeal in disputes. The decision of the committee will have the power of the federation to sustain it.

A committee has been appointed to draw up a declaration of principles and Constitution and By-laws, and the report is about ready, so that the organization will soon be perfected. It will answer for this locality the purpose that the Australian federation does in that country. The trades unions have become so strong, and some of their demands so arbitrary, that those who have capital invested in industrial enterprises consider it necessary to combine together for mutual protection and benefit.

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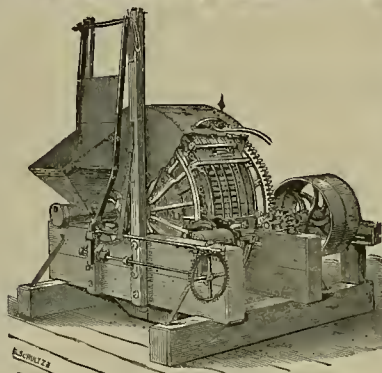
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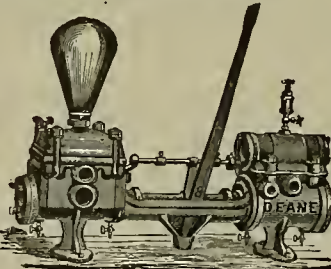
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SAMPLES OF ORE, PULPS, "ORGANIC ANALYSIS"
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Report on mines and undertake management of mining
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MINING EXPERT AND GEOLOGIST.

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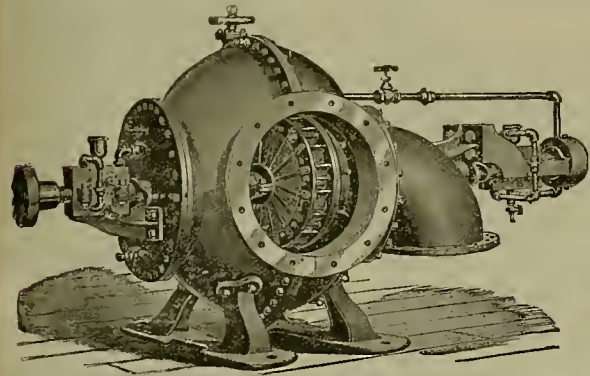
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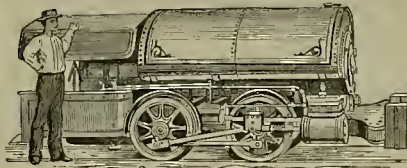
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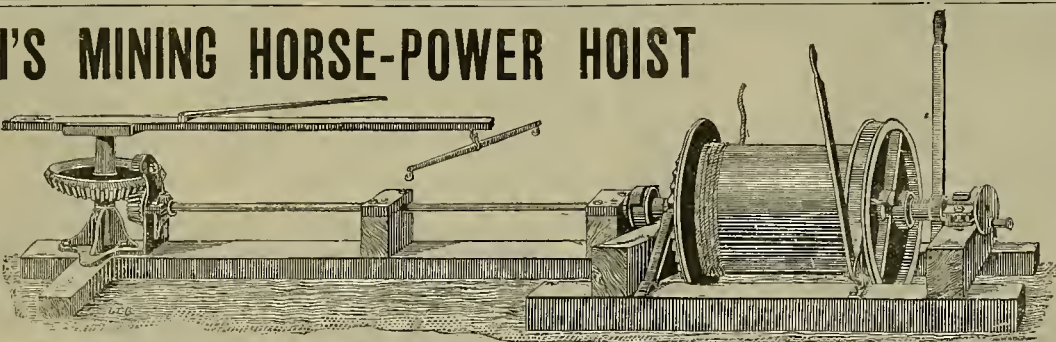
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SAN FRANCISCO, CAL.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, April 16, 1891.

General trade continues fairly active. Rains in the valleys the past week give stronger assurance of large crops, and as prices average well, a prosperous year with farmers can be predicted with the utmost confidence, and of course as farmers and miners prosper, so do other industries. The local money market is easy. Quarterly dividends are being disbursed which is an important factor in promoting an easy money market. Manufacturers appear to be greatly encouraged, notwithstanding labor strikes. Owing to cheap coals, iron, etc., bountiful harvests and water are assured in mining districts.

MEXICAN DOLLARS.—The market is essentially unchanged, being dull around 78 cts. The China steamer took out \$45,372 for China, and \$100,000 for Japan.

QUICKSILVER.—Receipts the past week aggregate 208 flasks. For the week ending April 9th exports by sea aggregated: Mexico, 100 flasks; Auckland, 10; and Mazatlan, 30. For the week ending to-day (16th) no exports are reported. The overland shipments for March aggregated 157,500 lbs. The market is reported unchanged with more or less cutting reported.

SILVER.—Purchases by the Department are reported as follows in this month:

Date.	Offered ounces.	Purchased ounces.	Price paid per ounce.
April 3.....	915,000	370,000	\$98200 to \$98375
April 8.....	400,000	400,000	\$97900 to \$98000
April 13.....	242,000	242,000	\$97800 to \$98050

Shipments by sea the past week aggregate, to Japan, 35,000 ounces and Bombay, 49,850.

The market has gradually fallen, until on yesterday (Wednesday) New York came through at 97 3/4 cts. The decline to many is unaccountable, with the Government purchasing 4,500,000 ounces a month and the output of the mines in this country claimed to be less than last year. On this coast we know that the production is less. There can be no doubt but European war rumblings have much to do with the market. The Continental nations, notably Russia and Germany, are increasing their stocks of gold; but while doing this there is nothing to warrant the belief that they are unloading their silver. But the fact that they are hoarding gold gave to purchasers and also the bear contingent a handle to knock silver down. It looks as if securities abroad, based on the market price of silver, are being quietly absorbed for a grand speculative boom later on, and when things are in condition for the bull campaign, silver will be advanced. The taking of gold from this country, contrary to Wall street opinions when silver was under discussion by Congress, does not make a ripple in the financial circles, for they know that it and more besides will come back in due season.

BORAX.—Receipts the past week aggregate 437 cts. The overland shipments in last month aggregate 640 cts. The market is fairly steady.

LIME.—Receipts the past week aggregate 3626 bbls, and exports by sea 715 bbls to Hilo and 200 bbls to Kahului. The home demand continues fair. The market is reported unchanged.

ANTIMONY.—It is claimed that purchases can be made below our quotations.

TIN.—Imports the past week aggregate 400 bxs. overland. For pig the market is quiet. The tone is barely steady. In plate, an active consumption is reported, but supplies were generally thought to arrive, consequently the market does not show it. Eastern and European advices report lower prices for pig under a decline in silver and more offering.

LEAD.—The market with us continues unsettled, with concessions obtainable. At the East the market appears to be of a waiting character, and any selling pressure is met by lower bids.

COPPER.—The market is barely steady. Eastern and European advices are confirmatory of an unsettled feeling in trade. There are rumors afloat and which are noted in best informed papers at the East, that indications point to a move to concentrate stocks and control the output.

IRON.—Stocks are large, as are consignments to arrive. The market is weak, with concessions obtainable.

COAL.—Imports the past week aggregate as follows: Newcastle, N. S. W., 6076 tons; Coos Bay, 950; Departure Bay, 3333; Seattle, 1340; Nanaimo, 1378. Total, 13,077 tons. The market has held barely steady. Light imports admit of working off spot and near by arrivals to better advantage. Dealers and large consumers do not appear disposed to anticipate their wants to any great extent, unless offered inducements. An improvement in crop prospects in this State and an almost certainty of a large wheat crop, cause coal buyers to be offish in making bids for forward shipment. They think that after May there will be free offers to coal for shipment to this port.

Eastern Metal Markets.

By Telegraph.

New York, April 16.—The following are the closing prices the past week:

	Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday.....	97 3/4	97 3/4	13 7/8	4 3/8	20 20
Friday.....	97 3/4	97 3/4	13 7/8	4 3/8	20 10
Saturday.....	97 3/4	97 3/4	13 7/8	4 3/8	20 10
Monday.....	97 3/4	97 3/4	13 7/8	4 3/8	20 10
Tuesday.....	97 3/4	97 3/4	13 7/8	4 3/8	20 10
Wednesday.....	97 3/4	97 3/4	13 7/8	4 3/8	20 10

Quicksilver continues in buyers' favor. Tin is lower and weak. Copper quiet at 13 3/4 for lake, 13 1/2 for Arizona ingot and 11 1/2 for casting brands. Lead less active and rather weak at 4 3/8 for domestic. Spelter, 5 1/2 @ 5 1/2, with small sales and the market depressed. Iron dull and generally unchanged, but the tendency of prices is believed to be downward. No. 1, Northern or Southern, \$17.50 @ 18; No. 2 do., \$16.50 @ 17. Steel rails quiet at \$30.

IN CONSEQUENCE of the strike against Buckingham & Hecht, the other three factories in the Shoe Manufacturers' Association closed Saturday night for an indefinite period. One thousand men, women and boys are thrown out of employment.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING APRIL 7, 1891.

- 449,996.—PROPELLER—O. J. B. Boeslager, Mount Angel, Or.
 449,844.—SAW GUIDE—W. A. Campbell, Portland, Or.
 449,847.—ELECTRICAL DENTAL ENGINE—F. F. Eggers, S. F.
 449,848.—DENTAL ENGINE—J. W. Gibson, S. F.
 449,933.—PIANO—A. Graff, S. F.
 450,014.—GRINDING MILL—L. D. Harding, Colfax, Wash.
 449,853.—DEVICE FOR DRAWING STEAM BEER—C. Harth, Willows, Cal.
 449,860.—RIDING PAD—W. C. McNeely, Sacramento, Cal.
 449,858.—STUMP PULLER—W. B. Morris, Seattle, Wash.
 449,764.—WINDOW SASH—A. Rudolph, S. F.
 449,866.—AUTOMATIC BELL RINGER—W. W. Slater, Oakland, Cal.
 449,980.—CONNECTION FOR WAGON TRAINS—W. H. Thurman, Fish Camp, Cal.
 449,717.—VEHICLE SPRING—H. Timken, San Diego, Cal.
 450,116.—THREE-RAIL TRACK FOR CABLE RAILWAYS—C. Vogel, S. F.
 450,117.—CABLE RAILWAY CROSSING—C. Vogel, S. F.
 450,118.—CURVE FOR CABLE RAILWAYS—C. Vogel, S. F.
 449,988.—BREECH LOADING GUN—H. W. Whitelaw, S. F.
 449,787.—ROW LOCK FOR BOATS—Jas. Williams, Portland, Or.
 450,092.—SLATE ATTACHMENT—Maud Wyman, Oakland, Cal.

The following brief list, by telegraph, for April 14 will appear more complete upon receipt of mail advices: California—Fred Bommemann, San Francisco, child's folding carriage; George R. Dural, assignor to the Benicia Agricultural Works, Benicia, traction wheel; Charles W. Harvey, Los Angeles, and C. J. Root, Bristol, Conn., said Root assignor to said Harvey, door spring; Charles S. Jones, Redding, Ore. mill; John C. Scudder, Dover, N. J., assignor to Repanno Chemical Company, Wilmington, Del., and Atlantic Dynamite Company, San Francisco, apparatus for making dopes for explosives; Henry E. Thomas, assignor of one-half to F. H. Hansman, San Francisco, self-power pump; Hilbert Tompkins, San Leandro, foot-strap for horses. Oregon—Langley Hale Jr., Glendale, assignor of one-fourth to G. A. Taylor, Roseburg, Ore. axle.

Washington—Joseph H. Bradshaw, assignor of one-fourth to J. Willey, North Yakima, barnes.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

GANG-PLOW.—James and William Paterson, Stockton, assignors to the Benicia Agricultural Works of Benicia, Cal. No. 449,329. Dated March 31, 1891. It consists of a main frame, to which the power is applied for moving the plows, said frame being binged in a central longitudinal line, so that there are two flexibly-joined sides, and diagonally-arranged supporting-timbers, to which the plows are attached in line together, with bearing wheels by which the depth of the plows upon the two sides may be independently gauged. By this construction the inventors counterbalance the plows by extending one series each side of the central timbers and by binging these timbers together and journaling upon them the bearing wheels with their respective operating levers they are enabled to raise or depress either end or the central portion of the frame and the plows connected therewith while by means of the jointed or flexible attachment of the two-part frame, a wide plow is allowed to adjust itself to variations in the surface of the ground.

CONSTRUCTION OF BUILDING.—Peter H. Jackson, S. F. No. 449,323. Dated March 31, 1891. In a former invention patented by the same inventor (July 22, 1884, No. 302,338) there was shown a riser-beam extending along the front of the elevated area and forming a step and support for the sidewalk and illuminating-surfaces and in connection therewith a beam-support and intermediate brackets by which the two are united. In the present invention the inner end of the sidewalk or illuminating surface is sustained directly, or nearly so, in line with the greatest strength of the supporting beam, and the tendency to a side and twisting strain which was developed in the former construction, is avoided. By the construction adopted, the sidewalk or illuminating surface is supported upon the lower flange of the beam, the principal depth of the beam extending above this point, and as there is very little of the beam projecting below it will not cut off the light and prevent its entering the space beneath and to the rear. This construction is simpler and more economical than any heretofore employed.

DEVICE FOR DRAWING STEAM BEER.—Constant Harth, Willows, Colusa Co. No. 449,853. Dated April 7, 1891. This invention relates to a device for drawing beer under a heavy head or pressure of gas. This class of fresh beer is known as "steam beer" in distinction from lager and other kinds, which take longer in making and have not so great a pressure of gas in them. This beer is usually made and placed in casks of various sizes which are delivered in places where the beer is to be sold by the glass, and the beer is drawn directly from the cask. The pressure of the gas is, however, so great that it is impossible to draw the beer without allowing some of the gas to escape and after the cask is more than half empty there is not pressure enough of gas to keep the beer in a sufficiently lively condition. This invention consists in the interposition of a chamber or receiver between the cask and the drawing g-off faucet and a means for conveying the

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COMPANY AND LOCATION.	NO. AMT. LEVIED, DELINQ. AND SALE.	SECRETARY.	PLACE OF BUSINESS.
Alpha Cons M Co, Nevada.....	6.....25c.....Mar 14, Apr 17, May 1.....	C. E. Elliott.....	309 Montgomery St
Jackson M Co, Nevada.....	37.....10c.....Apr 4, May 8, May 22.....	W. T. Baggett.....	309 Montgomery St
Atlantic Con M Co, Nevada.....	7.....25c.....Nov 19, Apr 1, Apr 27.....	D. M. Kent.....	330 Pine St
California State Co, California.....	5.....30c.....Feb 2, Mar 15, Apr 20.....	J. C. Henscom.....	9 Mission St
Carbondale Coal M Co, California.....	1.....10c.....Mar 13, Apr 21, May 7.....	E. L. Aiken.....	328 Montgomery St
Carmelo Land & Coal Co, California.....	3.....50c.....Apr 11, May 16, June 18.....	W. T. Baggett.....	324 Pine St
Chollar M Co, Nevada.....	29.....50c.....Apr 23, May 13, June 2.....	C. E. Elliott.....	309 Montgomery St
Cons New York M Co, Nevada.....	5.....15c.....Apr 3, May 8, May 23.....	C. E. Elliott.....	309 Montgomery St
Con St Gotthard M Co, California.....	2.....15c.....Feb 12, Mar 31, Apr 23.....	J. Wetzel.....	320 Sansome St
Cosmopolitan M Co, Nevada.....	6.....10c.....Feb 24, Apr 7, Apr 23.....	B. Burris.....	240 Montgomery St
Crescent M & M Co, California.....	5.....25c.....Feb 20, Apr 6, May 4.....	J. H. Inham.....	132 California St
East Sierra Nevada M Co, Nevada.....	5.....50c.....Apr 14, May 22, June 18.....	G. R. Spinnier.....	310 Pine St
Gray Eagle M Co, California.....	23.....3c.....Apr 3, May 18, June 9.....	A. W. Barrow.....	303 California St
Guasacaran & Cal M Co, Ho duras.....	4.....85c.....Mar 14, Apr 15, May 4.....	E. Oliver.....	22 Mint Ave
Hale & Norcross M Co, Nevada.....	39.....50c.....Mar 17, Apr 22, May 14.....	A. B. Thompson.....	309 Montgomery St
Luzo Marble Co, California.....	12.....10c.....Mar 29, May 12, May 29.....	T. F. Norman.....	419 California St
Kentucky Cons M Co, Nevada.....	1.....25c.....Mar 31, May 5, May 28.....	J. W. Few.....	310 Pine St
Lady Washington M Co, Nevada.....	3.....25c.....Mar 3, Apr 7, Apr 23.....	L. Osborn.....	309 Montgomery St
Locomotive M Co, Nevada.....	10.....50c.....Mar 17, Apr 12, May 12.....	A. H. Fish.....	309 Montgomery St
Mexican M Co, Nevada.....	42.....25c.....Mar 9, Apr 14, May 5.....	C. E. Elliott.....	309 Montgomery St
Mineral King M Co, Arizona.....	6.....10c.....Mar 23, May 18, May 23.....	T. F. Norman.....	419 California St
N Bloomfield Gravel M Co, California.....	47.....25c.....Mar 26, May 4, May 27.....	H. Pichor.....	320 Sansome St
Nevada Queen M Co, Nevada.....	7.....15c.....Mar 4, Apr 10, Apr 30.....	R. R. Grayson.....	331 Pine St
Northwestern M Co, British Columbia.....	3.....7c.....Mar 9, Apr 9, Apr 27.....	T. Bonacina.....	438 California St
Oak Cons M Co, California.....	4c.....Apr 11, May 18, June 10.....	E. J. Ryan.....	220 Montgomery St
Scorpion & M Co, Nevada.....	23.....50c.....Apr 14, May 18, May 23.....	R. Spinnier.....	310 Pine St
Sylvania M Co, Nevada.....	1.....81.50c.....Mar 14, Apr 28, May 28.....	J. J. Scoville.....	4 Sutter St
Silver King M Co, Arizona.....	5.....20c.....Feb 21, Mar 28, Apr 28.....	W. S. Metlar.....	325 Montgomery St
Teresa M Co, Mexico.....	3.....10c.....Mar 28, May 1, May 18.....	A. Cheminant.....	328 Montgomery St
Umpire M Co, Oregon.....	3.....2c.....March 27, May 4, May 22.....	A. Cheminant.....	328 Montgomery St

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Amador Volcan Ho M Co, California.....	M. Casey.....	503 California St.	Annual.	May 6

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Candelaria Cons M Co, New Mexico.....	G. Gale.....	509 Montgomery St.	25c.....	Dec 3
Champion M Co.....	T. Wetzel.....	320 Sansome St.	10c.....	Mar 16
North Banner Cons M Co, California.....	T. J. Mitchell.....	Grass Valley.	50c.....	Apr 20
North Star M Co, California.....	D. A. Jennings.....	401 California St.	50c.....	Apr 8
Johnson M Co, Nevada.....	.....	.....	50c.....	Apr 10
Pacific Coast Borax Co, California.....	A. H. Clough.....	230 Montgomery St.	1 00c.....	Apr 10

beer from the cask to this chamber and from the chamber to a peculiarly constructed drawing-off faucet which is used in connection therewith.

DENTAL ENGINE.—John W. Gibson, S. F. No. 449,848. Dated April 7, 1891. The object of this invention is to provide a dental-engine bracket which is adapted to be turned both horizontally and vertically, and also to provide simple and effective means for readily reversing the motion of the engine.

SAW-GUIDE.—Wm. A. Campbell, Portland, Oregon. No. 449,844. Dated April 7, 1891. The object of this invention is to provide a simple and effective saw-guide in which the opposing guides are readily adjustable to graduate the space between them, both guides being also movable in the same direction in order to throw the saw out of or in the cut, and the outer guide being adapted to be readily moved out of the way to change the saws.

ELECTRICAL DENTAL ENGINE.—Frank F. Eggers, S. F. No. 449,847. Dated April 7, 1891. This electrical dental engine consists of a motor journaled and rotating directly in the movable bracket of the apparatus, a means for stopping and reversing said motor, and in disengaging it from the mechanism which it drives, together with an extension for the bracket and its connections. The object is to combine in a single mechanism an adjustable dental bracket and a motor by which the flexible shaft which carries the various tools may be driven, a means for instantaneously disengaging the motor from the shaft, so that the latter will not be driven by the momentum of the motor, an extension mechanism for the bracket, and a switch whereby the direction of rotation of the motor may be changed at will.

AUTOMATIC BELL-RINGER.—Wm. W. Slater, Oakland. No. 449,866. Dated April 7, 1891. This is an improvement on a device for which letters patent were issued to the same inventor, Aug. 6, 1889, and it consists essentially in simplifying the number of parts and making a more direct connection for operating the clapper of the bell. It is especially intended to ring cautionary or alarm bells, such as are employed at railroad crossings and for similar purposes. It consists of a bell fixed to a suitable support having a swinging tongue or clapper and an air-actuated mechanism whereby the clapper is caused to swing, an electro-magnetic device whereby the valve is opened and closed and a means for alternately making and breaking the circuit for this purpose.

RIDING PAD.—Wm. C. McFeely, Sacramento. No. 449,860. Dated April 7, 1891. This is a device to take the place of a lady's side-saddle. It can be used with or without a blanket or saddle; and may be used in connection with a gentleman's saddle, thereby enabling a lady rider to use such a saddle and have her limbs suitably supported by the pad which occupies a space in front of the saddle when the latter is used. The device is light and contains the necessary elements of safety and at the same time is suitable for the horse's back.

STUMP-PULLER.—Wm. B. Morris, Seattle, Wash. No. 449,858. Dated April 7, 1891. Mounted on a sled so as to easily hauled over the ground is a vertical shaft suitably braced, and on this revolve two rope-winding drums of slightly different diameter. One portion of the rope is wound around the larger part of the drum and the other portion around the smaller part from the opposite direction so that when this drum is turned around, the rope unwinding from the small part of the drum will be wound up somewhat faster upon the larger part, and the difference in size of the two drums determines the amount of power which is applied. The light of the rope passes through a pulley-block, and from the hook on this block a chain extends to the stump that is to be pulled. The gearing is so arranged that a horse may walk around with the lever, or it may be operated reciprocally as desired. The device is light, powerful and effective.

Complimentary Samples.

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Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Mar. 26.	WEEK ENDING Apr. 2.	WEEK ENDING Apr. 9.	WEEK ENDING Apr. 16.
Alpha.....	.90	1.151.00	1.20	.83 1.10 .85 1.30
Alta.....	.85	.98	1.251.05	1.20 1.00 1.10
Andes.....	1.55	1.851.00	1.70	1.50 1.50 1.75
Belcher.....	2.55	3.002.35	3.202.50	2.90 2.0 3.00
Best & Belcher.....	6.50	8.007.75	8.005.75	7.252.25 8.00
Bullion.....	1.95	2.601.95	2.301.90	2.252.10 2.25
Bodie.....	1.20	1.51.15	1.451.25	1.401.20 1.30
Bullion.....	.40	.50	.45	.45 .45 .45
Commonwealth.....	.83	1.05	.70	.85 .95 .85
Con. Va. & Cal.....	10.87	13.711.62	13.37	11.0012.75 12.66 14.50
Challenge.....	2.35	3.102.40	3.101.95	2.502.00 2.50
Chollar.....	2.85	3.202.65	2.502.40	3.152.75 3.25
Con. Imperial.....	.20	.30	.20	.25 .20 .25
Caledonia.....	.60	.75	1.20	.70 .95 .75 .80
Crowa Point.....	2.60	2.452.65	3.102.30	2.752.30 2.80
Crocker.....	.20	.25	.25	.20 .15 .20
Del Monte.....	.30	.30	.30	.30 .30 .30
Eureka Con.....	3.50	3.50	3.75	3.833.85 4.00
Excelsior.....	.75	1.00	.83	.95 .70 .85 .75 .85
Grand Prize.....	.20	.25	.15	.20 .15 .20
Gold & Copper.....	3.05	3.752.15	3.75	3.453.30 3.60
Hale & Norcross.....	2.15	2.092.15	2.701.90	2.152.00 1.40
Julia.....	.20	.30	.20	.25 .20 .25
Justice.....	1.20	1.351.10	1.501.10	1.401.15 1.35
Kentuck.....	.35	.55	.40	.55 .30 .40 .30
Lady Wash.....	.15	.20	.15	.20 .15 .20
Monro.....	.55	.70	.55	.60 .55 .60
Mexican.....	3.45	4.503.75	4.203.50	4.653.85 4.75
Navajo.....	.35	.40	.30	.30 .25 .30
North Belle Isle.....	.90	1.25	.90	1.00 .85 .90 .95
Nor. Cons.....	.30	.35	.30	.35 .30 .35
Occidental.....	1.05	1.451.20	1.351.10	1.221.15 1.25
Ophir.....	5.25	5.625.62	6.005.62	6.255.75 8.12
Overman.....	3.00	3.403.35	5.123.75	4.203.60 4.05
Potosi.....	4.20	5.873.75	4.533.70	4.304.00 4.35
Peck.....	.15	.20	.15	.15 .15 .15
Peer.....	.10	.15	.10	.15 .10 .10
Savage.....	2.75	3.352.30	3.202.45	2.952.65 3.50
S. B. & M.....	1.20	1.601.50	1.551.20	1.601.25 1.50
Seattle & Grada.....	3.10	3.853.30	3.703.10	3.503.15 3.75
Silver Hill.....	.21	.30	.25	.30 .25 .30
Scorpion.....	.35	.40	.35	.40 .30 .35
Union Con.....	3.30	4.23.80	4.203.45	4.103.80 4.25
Utah.....	1.10	1.401.15	1.34	.95 1.251.10 1.25
Yellow Jacket.....	2.70	3.402.85	3.522.65	3.101.42 3.00

Sales at San Francisco Stock Exchange.

THURSDAY, April 16, 9:30 A. M.	
500 Alpha.....	1.40 @ 1.30
500 Andes.....	1.70 @ 1.75
500 Baltimore.....	8.00 @ 8.00
500 Belcher.....	2.95 @ 3.00
450 Belle Isle.....	1.50 @ 1.50
475 Best & Belcher.....	7.75 @ 7.75
150 Bodie.....	1.20 @ 1.25
250 Bullion.....	2.25 @ 2.25
500 Caledonia.....	1.85 @ 1.85
500 Central.....	1.50 @ 1.50
100 Chollar.....	3.

Mining Share Market.

Comstock mining shares the past week showed continued activity. All shaded off on Thursday and Friday, but the Middle and Gold Hills lost the largest per centage. On Friday afternoon Con. Virginia and Overman showed considerable strength at a slight advance which was followed on Saturday by slightly better prices along the entire line. On Monday the market opened higher for the North Ends and stronger prices for others. In the afternoon Ophir took the lead and sold for more money. On Tuesday Best and Belcher, Ophir, Con. Virginia and Mexican made a jump ranging from 10 to 15 per cent, and other stocks from 5 to 10 per cent. Tuesday afternoon Hale and Norcross moved up 20 per cent on morning prices. This advance caused more strength in other Middle stocks. Wednesday morning there was a further advance in the Middle under the leadership of Hale and Norcross. The Gold Hill stocks advanced slightly, but the North Ends held around at Tuesday's higher prices. The present higher end more active market, made so chiefly by cross-orders, does not appear to draw in new moneyed outside operators. The little trading being done by outsiders is confined largely if not entirely to habitual traders; and it is not these for they have not the money, that manipulators are seemingly trying to unload on, so as to collect assessments. Until manipulators succeed in unloading, it is reasonable to conclude the market will go higher, but when outsiders do take the stocks it is equally as reasonable to believe that the market will go down at a break neck speed, so as not to let them get out except at very low prices. This is the history of all former deals, and the present will be no exception.

Yellow Jacket, Chollar, Scorpion and East Sierra Nevada were assessed the past week. It is said in well informed quarters that assessments will be levied soon by several other companies. While insiders have the stocks, the assessments will do no harm to the market; it is only when stocks are well out that assessments send prices down. It now looks, as the writer has stated, that the market will go still higher although small set backs can be expected, until the pools unload, when a rapid decline of from 50 to 75 per cent from top prices can be looked for.

Outside shares have been dull and lifeless. It looks as if manipulators in them are waiting for the Comstocks to have this deal before attempting an up move.

The mining share market opened this (Thursday) morning slightly higher. After Call the market shaded off, but toward noon began to recover. The Quijotas developed more strength, but this is to be expected, for in all cases where stocks are concentrated, it is in order to strike rich ore, start up the mill or do anything to unload at higher figures.

The news from the Comstock mines reports an improvement in Hale and Norcross. The improvement is said to be in a winze, but if readers of this paper will refer to their back files of the PRESS, they will find where it is or will be when the deal; is well under way. Yellow Jacket's strike of rich ore, made some time ago, has brought the usual result—an assessment, but the ore is still in the mine. In Belcher's official letter an improvement is reported, which is liable to develop into something of importance. In Crown Point they are running for the west ledge on the 1000-foot level. In Ophir, and Best and Belcher they ought to report ore soon. Reliable advices from Con. Virginia continues to indicate that the work is developing a veritable rich mine. They also warrant our asserting that the assays ought to be higher. The Gould and Curry ore is being shipped to the Nevada mill. The assays should go high. Ophir has several hundred tons of ore taken out going from \$25 to \$45 a ton. Good news is expected soon from Porosi and Bullion. Con. Imperial continues to send ore to the mill. In last month 615 tons were milled, the bullion from which gave a net return after minting of \$13,735. The Overman mine continues to attract attention. The Alta group is being closely watched by miners.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, April 16, 1891.

ANTIMONY.....	23 00	—
BORAX—Refined, in carload lots.....	3 00	—
Flourished.....	8 00	—
Concentrated.....	7 00	—
All grades jobbing at an advance.		
COPPER—		
Bolt.....	23 00	—
Sheeting.....	23 00	—
Ingot, jobbing.....	15 00	—
do, wholesale.....	17 00	—
Fire Box Sheets.....	23 00	—
LEAD—Pig.....	10 00	—
Bar.....	10 00	—
Sheet.....	7 00	—
Pipe.....	30 00	—
Shot, discount 10% on 500 bags Drop, 8 bag.....	2 00	—
Buck, 8 bag.....	2 00	—
Chilled, do.....	2 20	—
QUICKSILVER—By the flask.....	64 00	—
Flasks, old.....	40 00	—
CHROME IRON ORE, 30 ton.....	10 00	—
STEEL—English, 10.....	16 00	—
Canton tool.....	9 00	—
Black Diamond tool.....	9 00	—
Pick and Hammer.....	3 00	—
Machinery.....	4 00	—
Toe Calk.....	4 00	—
TINPLATE—B. V., steel grade, 14x20, to arrive.....	6 50	—
B. V., steel grade, 14x20, spot.....	6 30	—
Onalco, 14x20.....	6 50	—
do roofing, 14x20.....	6 00	—
do, 20x28.....	13 00	—
Fig tin, spot, 3 lb., irregular, nominal.....	3 00	—
IRON—Bar, base.....	20 00	—
Norway, base.....	20 00	—
Spot.....	20 00	—
IRON—Glenbrook ton.....	30 00	—
Belmont ton.....	29 00	—
American Soft, No. 1, ton.....	30 00	—
Oregon Pig, ton.....	30 00	—
Pure Sound.....	30 00	—
Grey Lane White.....	25 00	—
Shotts, No. 1.....	25 00	—
Langdon.....	25 00	—
Thorndike.....	25 00	—
Gardner.....	25 00	—
Barrow.....	25 00	—
Cargoeft.....	25 00	—

THE Round valley coal lands are said to be now entirely owned by Flood and Mackay. The Enreka (Humboldt Co.) Standard says the deed calls for 23,362 acres of coal lands.

MELVILLE ATTWOOD, the mining engineer, has gone to Washington to examine a coal property.

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Assessment Notices.

GRAY EAGLE MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Placer County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 3d day of April, 1891, an assessment, No. 23, of Three (3) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 313 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 9th day of June, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
A. W. BARROWS, Secretary pro tem.
Office, Room 11, No. 313 California Street, San Francisco, California.

INYO MARBLE COMPANY.—LOCATION of principal place of business, San Francisco, California. Location of works, Inyo County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 30th day of March, 1891, an assessment (No. 12) of Ten Cents per share was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, 132 California Street, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 12th day of May, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 2nd day of May, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
G. W. LUCE, Secretary.
Office, 132 California Street, San Francisco, California.

CARMELO LAND AND COAL COMPANY.—LOCATION of principal place of business, San Francisco, California. Location of works, Monterey County, California.

Notice is hereby given, that at a meeting of the Board of Directors, held on the 11th day of April, 1891, an assessment, No. 3, of Fifty Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 9, 324 Pine Street, San Francisco, California. Any stock upon which this assessment shall remain unpaid on the 16th day of May, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 16th day of June, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale. By order of the Board of Directors.
W. T. BAGGETT, Secretary.
Office, Room 9, 324 Pine Street, San Francisco, California.

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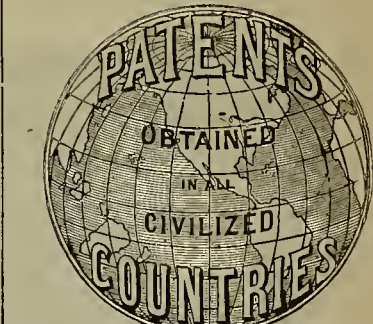
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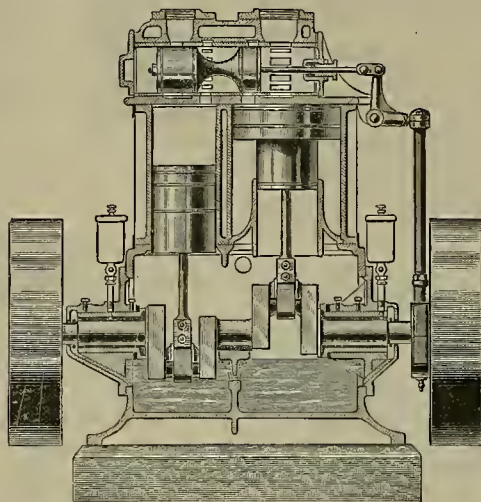
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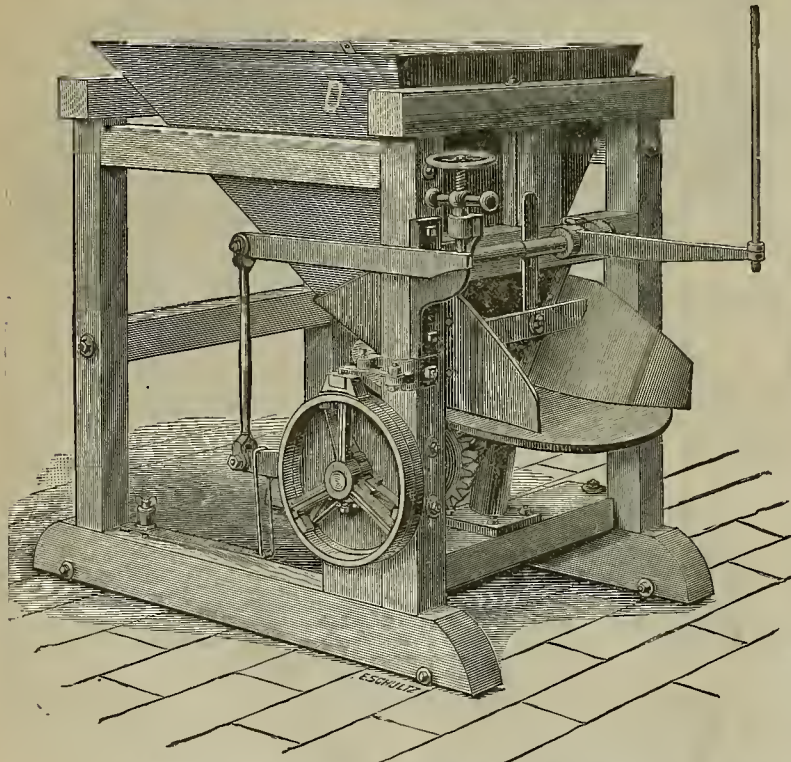
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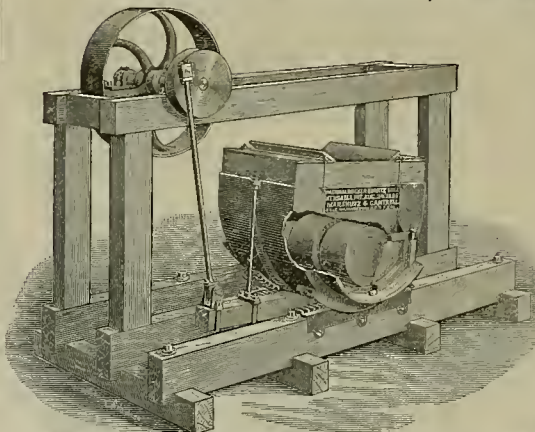
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NATIONAL ROCKER QUARTZ MILL.

KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY. 12 Tons in 24 Hours. 3 H. P.

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1. The cost is less than one-half of stamps of same capacity.
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6. There is no wear except on shoes and dies.
7. In point of amalgamation it is superior to any other machine in use.
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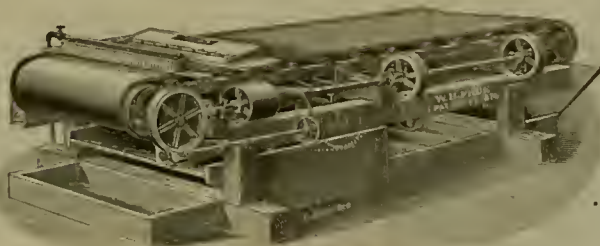
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The Best Ore Concentrator in the market, having double the Capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, crushing 350 tons per day, and is giving entire satisfaction as against 48 plain Belt Machines, taking the Pulp from the other 120 Stamps.

Price of Improved Belt Frue Vanner, \$825, f. o. b.
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ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., Room 15, No. 132 Market Street, San Francisco, Cal.



Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), London, October 8, 1885.
DEAR SIRS:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

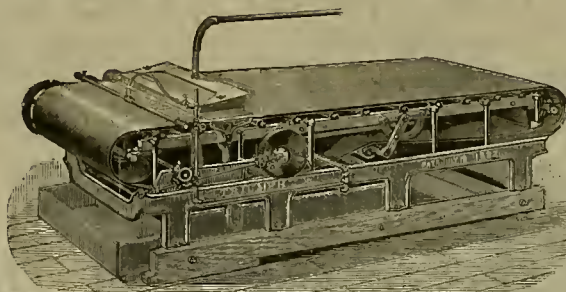
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction, that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumph"; for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt - - - - - \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.



JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)

Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.

Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:
GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices. DAVID McKAY, JR.,
(Signed) Sup't North Star and Original Empire Mining Co.

N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

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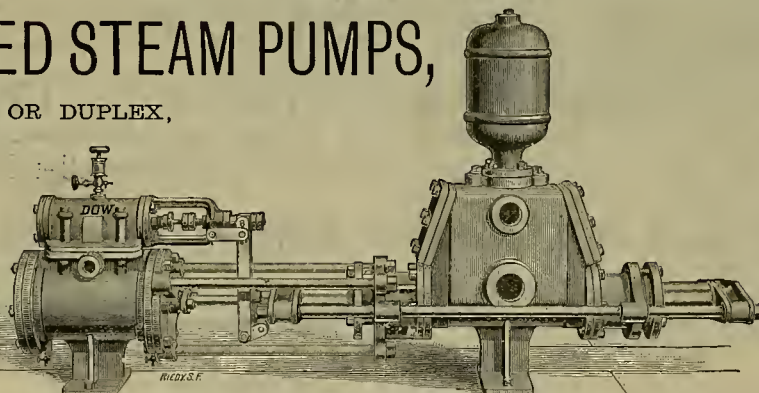
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FOR STEAM PUMPS, ETC., ETC.

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HOISTING ENGINES FOR MINES

1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.

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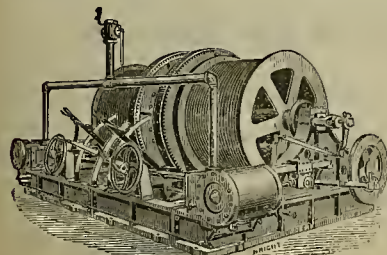
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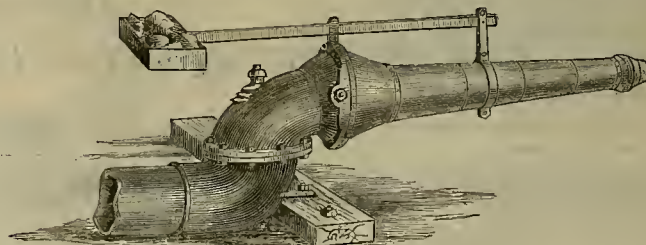
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PARKE & LACY CO., Agts., San Francisco.
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Elevator, 12 Front.

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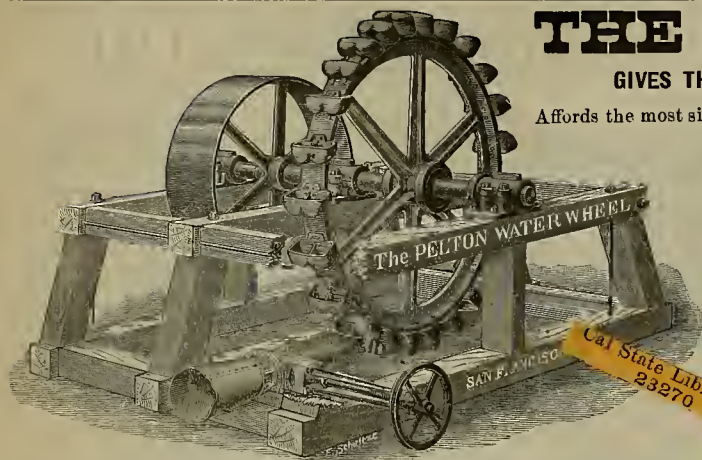
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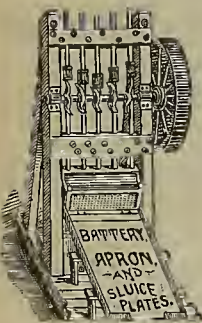
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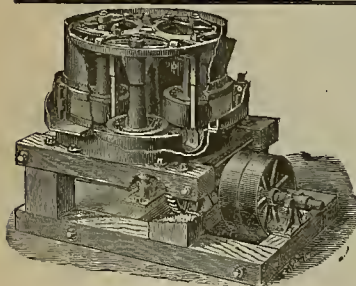
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Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

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Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE, which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safe in Handling.

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FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroads and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXII.—Number 17.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, APRIL 25, 1891.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Quartz-Crushing Appliances.

One of the engravings on this page shows the high-class Cornish rolls manufactured by the Riedon Iron Works of this city. Cornish rolls are sometimes used instead of stamps for dry pulverizing of ore after it has passed the rock-breaker. Two sets are generally used—the roughing and the finishing, roughing rolls taking the ore from the crusher, delivering it through revolving screens, from whence all that is too coarse for the roaster or jig is returned to the finishing rolls, which are adjusted to reduce the ore to the desired fineness. Any ore still too coarse can again be returned to these or another set of finishing rolls. Rolls can be used to best advantage in large mills, where they can be worked continuously to their full capacity. The rolls shown in the engraving are of the best design, strong and durable. Ten sets of these rolls were made by the Riedon Works for the Anaconda mine, Montana. The other engraving shows a type of ore crushers made by the same works.

Government Ships Built Here.

The armored coast defense vessel Monterey, which will be launched from the Union Iron Works' yard on Tuesday next, in the presence of the President and party, will be a more powerful ship than many suppose. Her length over all is 261 feet; load water line, 256 feet; extreme beam, 69 feet; mean draft, 14 feet 6 inches; displacement, 4000 tons; armor belt amidships, 13 inches thick; estimated speed, 16 knots.

Her armament consists of two 12-inch breech-loading rifled guns, with 13-inch steel armor protection; shield 8 inches thick; projectile

weighs 850 pounds; powder charge, 425 pounds. Two 10-inch breech-loading rifles mounted en barbette, 11½ inch steel armor protection; steel shields, 7½ inches in thickness; projectile

weighs 500 pounds; powder charge, 250 pounds. She also has six 6-pound rapid-firing rifles; four 37-millimeter Hotchkiss revolving cannon and two 1-pound rapid-firing rifles.

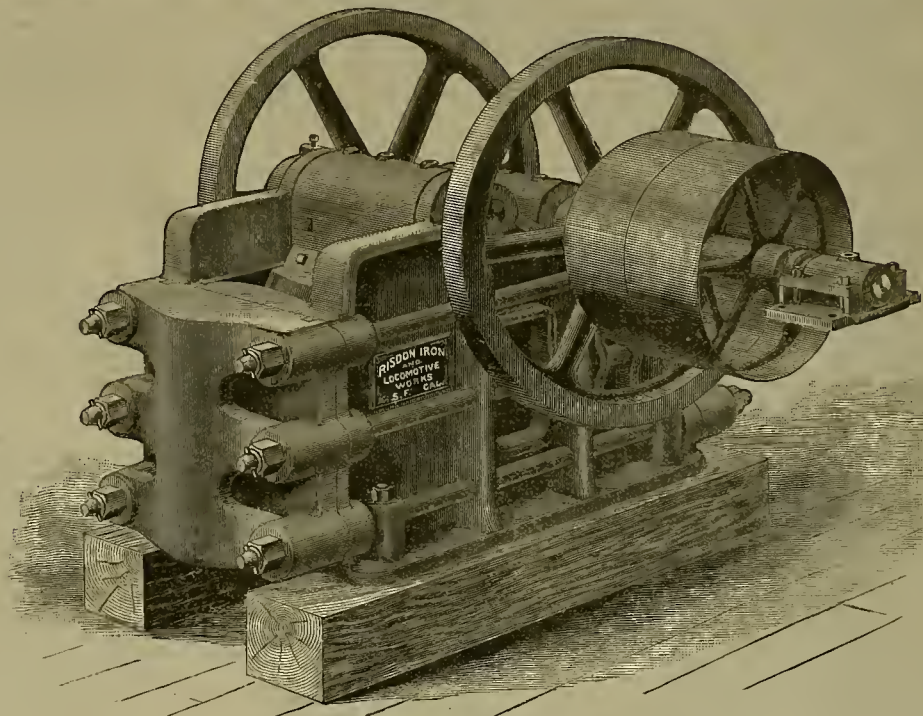
It will be seen that this vessel is of comparatively light draft, being very full and round, something in shape like a center-board sailing vessel. She has very small free board, that is, low sides above the water. There are two turrets with conical tops.

This is the third of the cruisers built by the Union Iron Works in this city, the Charleston and San Francisco having been completed, and the Monterey ready to launch. "Cruiser No. 6" and the "battleship" Oregon are still to be built. The Charleston is 3780 tons, San Francisco 4080 tons, Monterey 4000 tons, Cruiser No. 6 5800 tons, and Oregon 10,250 tons.

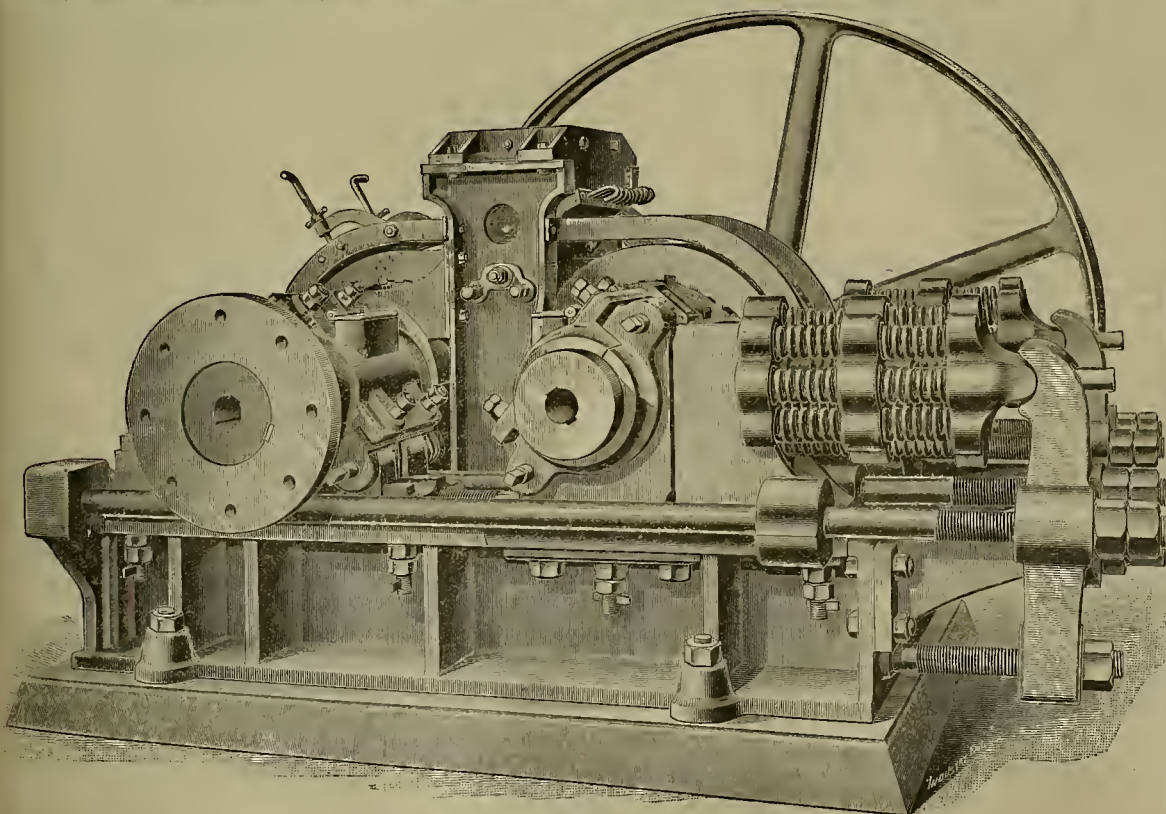
The contract for the Monterey was signed June 14, 1889. The first frame was laid October 7th, and first keel-plate laid on December 20th of that year. The first rivet was driven January 10, 1890, first frame raised January 16, 1890, and the launch will take place April 28th.

THE IDAHO MINE.—The new ore body that is now being opened up on the No. 18 level of the Idaho mine, Grass Valley, promises to be very important, as the quartz shows finely in free gold and carries well in high-grade sulphurets. Supt. Edward Coleman regards this new ore body as a distinct shoot from the regular shoot from which such a large amount of gold has been taken, and although not disposed to be over-enthusiastic in reference to it, says he regards it as an important development, and one which may prove of value in the future working of the mine. The depth at which this new shoot is found is about 2000 feet vertically from the surface, or 2700 feet on the incline.

THE NEWEST WORKS OF THE SOUTHERN PACIFIC CO. at Oakland will soon be in operation. The works are intended to prepare piles and timbers exposed to dampness, so as to preserve them.



IMPROVED ROCK-BREAKER.



HIGH-CLASS CORNISH ROLLS FOR ORE.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

Loss of Gold.

[Written for the MINING AND SCIENTIFIC PRESS by
C. H. AARON.]

I think the article on this subject in your issue of 11th inst. by Mr. A. B. Paul is well worth the attention of gold millmen. It is true that in the very few instances where I have had occasion to know, the loss of gold was not heavy; but I have had little to do with ordinary gold milling, and Mr. Paul's statements are not to be questioned, being based on experiments made in a satisfactory manner. It must be admitted that in the month's run of the celebrated Spanish mine, the results of which I investigated and reported for the State Mining Bureau in 1888, more gold was lost than saved, but the original contents of the rock were so very low that they could hardly have been better worked with any hope of profit. Some years ago I was employed to investigate the working of a gold mill in this State, the owners of which thought their rock was much richer than it was, and were not satisfied with the returns. I took samples of the rock coming from the breaker and from the discharge at the end of the tailrace, beyond the Hendy concentrators and blanket sluices. I think I know how to take samples of tailings. Only clear, settled water was poured off; the remainder was holed to dryness. I did this during two days, my samples being quite large; that of the rock was of several hundred pounds weight.

My assays showed that the rock contained about \$11 per ton; the tailings about 30 cents per ton. The gold was not generally visible in the rock, and a part of it was in sulphurets.

I reported to my employers that the mill was doing satisfactory work, and if they were not getting the proper quantity of gold, it was because they were being robbed. This idea they could not entertain, as the mill foreman was a very pious gentleman who would never let the mill run on Sunday. They paid me for my services, but I thought they did not seem to be satisfied. About a month later it transpired that the pious millman used to devote Sunday afternoon to a partial cleanup of the mill on his own account! This shows that the losses in gold-milling are not always due entirely to flotation, rusty gold, etc.

As to dry amalgamation, I think Mr. Paul first got the idea in 1867 at the Silver Sprout mill. At all events, prior to that date, a gentleman told me that he had tried dry amalgamation of raw sulphurets in an arrastra with excellent results, except the difficulty of recovering the quicksilver. This difficulty, it seems, Mr. Paul has overcome, and I think he is very likely to be right in saying that his method is the best for high-grade rock. I also think he is right as to the advantages of the arrastra in the treatment of rock of a moderate grade of richness, the limit depending on circumstances, and here I will once more suggest, as I have done before, that those who are amalgamating gold in arrastras or pans should try the effect of adding to the pulp a little solution of cyanide of mercury in cyanide of potassium.

In this solution gold is positive to mercury, consequently gold precipitates mercury upon itself, and every particle of the precious metal in the pulp so treated becomes amalgamated on its surface, and, in this condition, readily adheres to and sinks into a mass of mercury on contact. Gold, which mercury will not touch, even with the aid of cyanide of potassium alone, amalgamates readily in this way. The method might possibly be applied in battery amalgamation also, if the water were saved and used continuously.

The "medicine" should not be used too freely as it dissolves gold in exact proportion to the precipitation of mercury, though, however, it is very likely that the dissolved gold may be recovered by the use of a little zinc amalgam in the pan or arrastra, as zinc precipitates both metals from the cyanide solution, though iron does not, hence the process may be used in an iron pan, or in Paul's Americanized arrastra.

I think the solution is most cheaply and conveniently obtained by dissolving the red oxide of mercury in a solution of cyanide of potassium. The latter must be in excess, as cyanide of mercury alone does not deposit on gold. The solution may be tested by putting a drop of it on a gold coin and slightly warming the coin. In a very short time the spot where the drop is will be whitened.

Red oxide of mercury costs about 90 cents per pound, and cyanide of potassium for milling about 40 cents per pound. As a very small quantity will suffice for a ton of ore, it cannot be very expensive and is certainly worth trying. I should be gratified, and others would be benefited, if any person who may make the experiment in practical working would report results through the MINING AND SCIENTIFIC PRESS.

It is important that the pulp shall not contain an acid salt, and, as gold rock containing sulphurets is pretty sure to form a pulp containing sulphate of iron, it will be best to add a little lime, soda or ash before putting the "medicine" in, so as to make the pulp faintly alkaline—that is, so that it will make reddened litmus paper become purple or blue.

Even when this solution is not used, I think it would be desirable to make the pulp slightly

alkaline by means of ashes, soda or potash, because it has been shown that sulphate of iron is injurious in amalgamation. Cyanide of potassium alone can dissolve fine gold, hence those who use it in pans or arrastras should not omit to add also some zinc amalgam, which is easily made by warming some mercury and adding metallic zinc.

Nevada County's Mines.

[From Our Traveling Correspondent.]

Grass Valley.

EDITORS PRESS:—In the early history of quartz mining in Nevada county, the mining operator abandoned a mine whenever the pay gave out. There was a general disposition to retain all that had been extracted from the quartz and a general disinclination to expend a dollar in further prospecting. As the result, mine after mine was "worked out" (?) closed down and abandoned. In time these worked-out mines were reopened and a comparatively small amount of work showed up large bodies of ore as rich or of still greater value than those originally exploited. This success stimulated others, and gradually, one by one, the old mines were taken hold of, until to day there is scarcely a mine in the vicinity of Grass Valley that is idle. On every hand the new hoist or mill greets the eye and the people all have that confidence following continued success that leads them to believe that in depth every mine in the section will prove of value. This general activity among all the mines has its effect on the town as well, and the stranger soon feels that Grass Valley has some solid backing to produce the business prosperity of the city.

It is the opinion of every one that there has never, in the history of quartz mining, been a time in this section when the outlook and present condition was as promising and prosperous as right now.

The early history of the different mines is so generally known to the readers of the PRESS that it is not necessary to go into the past, but rather to give a short description of the present condition of the working mines visited by your correspondent.

The Idaho.

Edwin Coleman, superintendent enjoys the enviable distinction of being the deepest dividend paying gold mine in America. The past history of the mine is in keeping with the present, with every assurance that the future shall equal it in the regularity and amount of dividends. The mine is operated by an incline shaft which at this time is about 2,400 feet on the vein or 2,000 feet vertical. The vein at this time is averaging two feet at bottom of shaft, the ore carrying about one per cent of sulphurets that go \$80 to the ton. The vein matter now averages \$15 to the ton. The vein in the Idaho gave out in a manner similar to all the mines of Grass Valley, at 1,600 feet and came in again at 1,900. At this time a shaft is being put down on the undeveloped portion of the mine. The vein is here three feet in width and very promising. It is the general opinion that the ore of this unexplored end of the mine will prove equal in value to that extracted from the old workings. In that event the mine has still a long bright future before it. The mine is now equipped with a 40 stamp water-power mill complete in every detail. The balance sheet of the company shows not only that mining does pay, but that it pays handsomely, and that one good mine will pay for the money expended on a large number of poor mines. Up to March 1891, the Idaho had yielded \$11,265,273; of this amount \$4,845,300, has been paid to the fortunate stock-holders in dividends. Few gold mines can show a larger or more profitable record.

The Empire.

The Original Empire M. and M. Co., G. W. Starr, superintendent is located one mile southwest of Grass Valley on Ophir Hill. The mine is opened and operated by an incline shaft 2,000 feet on the vein, in depth almost equalling the Idaho. The veins are two in number distant from 100 to 150 feet from each other. The average width of the veins is 15 inches. On the veins, drifts have been run for a distance of 3,500 feet; the vein matter carries three per cent of sulphurets that run from \$40 to \$150 a ton. The quartz yields from \$15 to \$23 a ton. The mine is equipped with a fine plant, including a 40 stamp mill, that can be run by steam or water, as desired. The mill crushes an average of 75 tons a day. The mine has been in operation since 1854, and has paid in the past ten years about \$400,000 in dividends; no small degree of the success attending the operations of the mine is due to the competent and faithful services of Mr. M. Provins who has been in charge of the mill in all the mines, ups and downs since September 1, 1865, a record seldom equalled.

The North Star Mine.

Emile R. Abadie, superintendent, is two miles south of Grass Valley. The mine is equipped with one of the largest and most complete plants in the district, all operated by water-power. The mine has been operated since 1850; by the present company since 1884. During that time the company has developed the mine from the 1200 to the 2100 foot level. At the present time, the ore is from the 1800 and 1900 foot levels, with connection just made

to the 2000. The main shaft has been put down 124 feet since last fall. The vein shows an average width of 16 inches, which carries five per cent of sulphurets. These while medium in grade make up in quantity what they lack in value. The mine is one of the best in the section, as is shown by the fact that in the next few years the present company has paid \$300,000 in dividends, with a dividend of \$50,000 for April 8th.

W. Y. O. D. Mine.

C. A. Brockington is superintendent of the "Work your own Diggings" claim. This mine is down 800 feet by incline shaft, showing a vein three feet in width that carries five per cent of sulphurets that average \$200 a ton; and the vein matter delights its owners by yielding an average of \$50 a ton. The mine has been drifted on for a distance of 502 feet all in good ore.

The mine is at present equipped with a five-stamp mill; small as the crushing capacity is, the mine is paying dividends of \$1500 a month. This season a large hoisting plant and 10-stamp mill will be erected, where a steady stream of dividends of \$2500 a month can be depended upon.

The Gold Hill Mine.

Geo. Mainhart, superintendent, is equipped with a fine hoist; as soon as arrangements can be effected for water-power the mine will be started up. The mine is opened to a depth of 500 feet by shaft, with drifts run 500 feet on the vein. The vein averages three per cent in sulphurets that go \$75 to the ton, while the vein matter is reported as averaging \$10 to the ton.

Omaha and Lone Jack Con.

Geo. Mainhart is superintendent of this mine. It is opened to a depth of 800 feet on the vein by incline shaft, with drifts run up to 1700 feet in length. The mine has three ore shoots, 250 to 400 feet in length. The average width of the vein is ten inches, which is reported as carrying four per cent of sulphurets, running from \$60 to \$125 a ton, while the vein matter averages \$23 a ton. The mine is equipped with a 28-stamp mill, crushing 40 tons a day. The mine is opened by two shafts, the Omaha 800 feet and the Lone Jack 700, with hoists at both shafts and both shafts connected by drifts.

The Menlo Property.

This consists of the Wisconsin and Homeward-Bound mines, Ernest Wiltse superintendent. The Homeward-Bound may be said to be the south extension of the Omaha, and, in consequence, will in depth receive the ore shoots of that mine. The Wisconsin had been closed since 1872, the Homeward-Bound since 1881, until the present company took hold of the mines in April, 1890. The Homeward-Bound is opened by an incline shaft 360 feet deep on the vein, with drifts run 350 feet north and south, or 700 feet on the vein, showing it to be one to four feet in width, of ore that carries an average of three per cent of sulphurets that go \$80 to the ton, with the ore reported as going from \$8 to \$15 a ton. The Homeward-Bound contains three known shoots of 200, 250 and 300 feet in length, with about 100 feet between shoots.

The Wisconsin.

This mine was extensively and profitably worked in former years to a depth of 500 feet, with a record of \$20 to \$60 a ton. The present company is opening a shoot of ore not heretofore worked, and they are down over 175 feet on the vein, with drifts run 250 feet. The old shaft was on the "beel" of the north shoot, and the ore from this shoot alone extended to a depth of 500 feet. The present company is going down on the toe of the south shoot, and will run back and out all three shoots. The vein has an average width of 18 inches of ore, running three per cent in sulphurets that go from \$75 to \$100 a ton, while the quartz is reported as running from \$15 to \$30 a ton. The mine covers 3200 feet on the vein. At present it is equipped with hoists only, but the company will, in the near future, bring in water for power and erect a mill.

The Hartery Con.

S. P. Fowler is superintendent of this mine, which is opened to a depth of 600 feet by shaft, on the vein, which carries an average of three feet that runs as high as 15 per cent in sulphurets, averaging \$40 to the ton. The ore runs from \$15 to \$23. A drift has been run 600 feet on the vein, showing a shoot 300 feet long. The mine is at this time equipped with hoist alone. A mill will be erected this season. The Gold Hill, Omaha, Wisconsin, Homeward-bound and Hartery are all on Wolf creek, from Grass Valley to the Hartery, three miles south.

Rocky Bar G. M. Co.

H. Silvester is the principal owner and manager. The mine is located on New York Hill, 1½ miles south of Grass Valley. At this time it is being worked under tribute. The shaft is down 600 feet, showing a vein 12 inches in width carrying five per cent of sulphurets, that give from \$40 to \$500 a ton, while the ore has averaged \$17.50 a ton. The ore extracted at this time by the tributors goes from \$50 to \$100 a ton. There is a 10-stamp mill on the property.

The Crown Point.

A. Gauthier is superintendent and owner. The mine is just on the east edge of Grass Valley, and but a short distance from the Idaho. The working shaft is down 400 feet, with drift run 550 feet east and 280 feet west. In these workings, the vein shows an average of seven

feet of ore carrying 1½ per cent of sulphurets averaging \$100 to the ton. The vein-matter has averaged \$17 a ton. Some exceptionally rich rock has been extracted in working the mine. On the day of my visit, rock was taken out that was very liberally sprinkled with coarse gold, while Mr. Gauthier showed two pieces of rock, one of which, weighing nine pounds, had 28 ounces of gold, which at \$16 an ounce made its value \$448, or about \$50 a pound. Another piece of rock, much larger, was completely studded with fine gold. Mr. Gauthier is the inventor and patentee of a vibratory amalgamating table, which saves 15 per cent of gold over the common system. The nasal mill-plate is given a rapid shaking motion that causes the gold to settle as the pulp passes over the plate; by reason of this shaking motion, a smaller amount of water is required. The plates discharge with a very small pitch, and in consequence a much larger amount of quicksilver can be placed on the plates and the same retained.

The Coe Mine

Is owned by the Golden Queen M. Co., James Hammill superintendent. The Coe is in sight of the Crown Point, and is opened by shaft 500 feet deep on the vein, with drifts run 250 feet west and 60 feet east on the vein, showing an average width of three feet, carrying two per cent of sulphurets that go from \$100 to \$120 a ton. The average value of the ore is \$16. The company is satisfied that it has a mine and will erect a 20-stamp mill this summer.

New Eureka.

This mine, of which W. A. Weldon is superintendent, is midway between the Crown Point and Coe. The company put down a shaft 600 feet, and encountered a horse, and has been drifting west to get into ore. At the time of my visit, the face of the drift was looking very promising, with every evidence of ore ahead.

Brunswick.

E. Fitzgerald is superintendent of this mine. It is located 2½ miles southeast of Grass Valley on Union Hill. The mine is opened by incline shaft to a depth of 380 feet. On the first level a drift has been run 1000 feet on the vein. In the second 500 feet and on the third 230 feet. The average width of the vein is three feet which carries 1½ to 2 per cent of sulphurets that go \$100 to the ton. There has been no ore milled from the present development, but assays show values ranging from \$6 to \$190 a ton. The mine is equipped with a 20 stamp mill arranged for steam or water power.

The Peabody

May be said to be in Grass Valley on Gold Hill. The old shaft is down 200 feet on the vein which runs from 6 to 18 inches in width of ore that averages \$15 a ton. There is in the mine a shoot of \$25 ore called the North shoot. To tap this shoot, a fine three compartment shaft is now being put down by the superintendent, Mr. E. Tilley.

The Centennial

Is owned by H. Silvester. This property is on Boston Hill, 2½ miles southwest of Grass Valley. The mine is opened by shaft on the vein to a depth of 600 feet. The vein averages eight inches in width of ore that goes from \$40 to \$100 a ton and carries three per cent of sulphurets that run from \$150 to \$200 a ton. The mine is now under bond. The intending purchaser will proceed to equip and develop the mine and erect a mill this season.

In this connection, it may not be amiss to state that the old Watt & Riley ground, embracing a number of claims, is now under bond and will be developed this season by a strong syndicate. The properties are all on Massachusetts Hill.

Orlean G. M. Co.

This property is 1½ miles south of Grass Valley and joins the Empire on the south. It consists of six full locations, or 6000 feet on the vein. J. R. Smith is superintendent. The mine is opened by three shafts sunk on the vein to a depth of 700 feet, with drifts run on the vein for a distance of 4000 feet. The vein averages 15 inches in width, and carries five per cent of sulphurets that give \$65 to \$75 a ton, while the rock averages \$15. At this time the company is engaged in sinking a perpendicular shaft to a depth of 800 feet. On its completion and connection with the drifts, a new mill will be erected.

The Maryland.

S. P. Dorsey is superintendent. The Dorsey mine joins the famous Idaho on the east and thus claims the Eureka ledge. The location consists of 2000 feet on the vein, which is opened by shaft to a depth of 325 feet. A vein running from two to seven feet has been shown which will soon be crossed by a drift of 250 feet from the shaft. At 900 feet the shaft will cut the vein. At present all of the work is of a developing character. There has never been any doubt as to the value of this property, but it has been merely a question of development. The walls are excellent—smooth and polished like glass. In addition to Mr. Dorsey's own work, the shoot being opened by shaft on the Idaho will in time be received by the Maryland in depth and the Maryland prove a second Idaho.

The Banner Mine.

John Skewes is superintendent of this mine, which is northeast of Grass Valley six miles, on Banner mountain. The mine is opened by a tunnel 1500 feet long to the vein and shaft from the end of tunnel 400 feet deep, giving about 800 feet in depth on the vein. The vein has

been drifted on for a distance of 500 feet, showing an average width of two feet that carries five per cent of sulphurets giving \$140 to the ton, with vein matter averaging \$15 a ton. The mine is equipped with a complete ten-stamp mill, which, with all of the other improvements, has been paid for out of the returns from the ore extracted, save an assessment of \$3000. The mine is now paying dividends of \$5000 a month, with every assurance that under Mr. Skewes' practical management, they will be continued indefinitely.

Pittsburg.

The Pittsburg, Chas. Stock's superintendent, is located midway between Grass Valley and Nevada City. The property is an old million producer. In the past she has produced over a million dollars, and it is Mr. Stock's ambition to make her add several more to that number. Those who know him and the mine have no doubt of his succeeding. The mine is opened by an inclined shaft to a depth of 1000 feet, with drifts run 1000 feet on the vein, showing an average width of 12 inches of ore carrying two per cent of sulphurets that go \$60 to \$70 a ton and ore that averages \$15. The mine is opened by nine levels and is equipped with an exceptionally fine ten-stamp mill. The mine has just changed hands and is now the property of the New Pittsburg Grass Valley Gold Mining Co., Limited, which will proceed to work the mine on an extensive scale.

Chlorination Works.

The sulphurets of the section have been treated in the chlorination works of Mr. Maltman, which are midway between Grass Valley and Nevada City, and the works of Callot & Co., located one mile east of Grass Valley. Mr. Maltman's works have a capacity of three tons a day and the Callot 2½. Heretofore the sulphurets have been worked for \$20 a ton, less 10 per cent for loss, but at this time the rule is to buy outright on the assay value. For the working of the sulphurets, and the ore also, of this section and all parts of the U. S. as well, the Grass Valley Gold-Extracting Co. has erected a large plant near Grass Valley. The company owns and will operate the Pollock system of ore treatment. This is the only plant of the Pollock process in the U. S. To give the description due so important an undertaking, the full details will be found on another page of the PRESS.

Iron Works.

No small degree of profits realized in mining is due to the convenience of a near-by foundry. In this the Grass Valley mines are favored in the foundries and machine shops of Mr. Larkenna and Mr. Taylor.

The Mines of Grass Valley

Have a habit of disregarding all rules and precedents in dip and strike. Originally it was thought that those mines only, that conformed to established strike and dip could prove profitable or permanent. All this has been upset, however, until now it is simply a question of finding a fair-sized vein of quartz in the vicinity of Grass Valley and staying with it. The opening up of the number of old mines that had been abandoned as worked out, together with the development of new ore bodies, has sent Grass Valley to the front, and to-day there is the evidence on every side, that this section has a near future before her that will not only equal but excel that of any gold quartz mining district in the United States.

Nevada City.

Nevada City owed her wealth to her immense gravel deposits where gold by the hundreds of pounds—not ounces—was cleaned up at each run. When the courts closed the hydraulic mines, the people went into quartz mining in the Grass Valley section, and waited patiently for a turn in the tide. As the turn has not come, and there is no prospect of an immediate change in the tide, prospecting was begun to find gravel in the old channel that would pay to drift. The Harmony Mining Company, whose property is 1½ miles north of Nevada City, put down a shaft 330 feet, run a drift 700 feet, and cut the channel at bedrock. The company has drifted 100 feet across the channel without reaching the rim. There is from one to seven feet of pay between the bedrock and pipe clay, which averages \$1 a car. In 1860, this mine produced \$40,000.

The West Harmony joins the Harmony on the west. The owners are erecting a hoist and preparing to develop. The Cold Springs joins the Harmony on the east, but the property is idle.

The Fountain Head joins the Cold Springs on the east. The owners are erecting a hoist at this time. The channel has been prospected for a distance of two miles. While the amount extracted from the streak next to the bed-rock by drifting is less than one per cent of what could be taken out of the immense deposit (the channel is over 100 feet deep, pay all through it and miles in length), still it will put new life into Nevada City, as the extent of ground is immense. It will require a large force of miners to work it and take many years for its extraction. A snowstorm coming up prevented my visiting the mines of the Washington District, located 20 miles above Nevada City. The reports, however, are all to the effect that the mines of the section are all running to a profit. No small degree of a section's wealth is due to the hotel accommodations of a section, as capitalists dread a camp with a poor hotel. The traveling public make the National Exchange, Rector Bros. proprietors, of Nevada City, their headquarters and go back and forth to Grass

Valley by coach at a nominal charge of 25 cents for the round trip. If there is a better location for a first-class hotel, with a well-provisioned table, than Grass Valley with her 8000 inhabitants and large transit trade, I fail to know it. Success to Grass Valley!

E. H. SCHAEFFLE.

Placers of Sonora, Mexico.

NUMBER III.

EDITORS PRESS:—After demonstrating, in the manner already described, the great value of the placers of Los Llanos and Cienega, for working on a large scale by hydraulic processes, we again gave our attention to the dry methods of extracting gold from the sands and dirt, proving as near as possible the practicality of using steam as a motive power to run dry-washing machines, built on a much larger scale, than those used by the natives.

As fuel and water are abundant for steam purposes, and easily transportable to the main part of the placers, we estimated that with a good out-of-engine 8x20 inches in size, and portable, with a suitable boiler, separate, and also portable, the material could be handled in such an economical manner, as to make a handsome profit almost certain.

Our plans also encompassed the application of the power by helting to a dry-washer to be built something like one of our large threshing machines; the dirt to be fed to it by elevators, and through several sets of light steel rolls to thoroughly powder the material. The machine in other ways to run in a manner much like the method described in a previous article.

To run the dry-washer, we estimated that one cord of mesquit wood, at \$3 per cord, would be required every 24 hours for making steam, with the consumption of 1000 gallons of water in the same time, and costing say \$5 per day for its transportation. It was also figured that 15 men would be required at an average of \$1 per day each, and for wear and tear and all other expense, say \$10 per day additional, making in all an outlay of \$33 for each 24 hours.

We had no doubt but that the machine could be made to handle perfectly from 500 to 700 tons per day, and with the method of "cleaning up" the gold and black sands by means of an amalgamating pan, which we had successfully adopted in our sluicing experiments, a much better yield could be obtained than the returns by Mexican or Yaqui methods.

It will be seen that a machine working on favorable ground would clean up say \$100 to \$140 per day, or about \$60 to \$100 net profit, the work following through eight months of the year. From the great extent of the placers, it would be only a question of the number of plants like the above to bring the returns up to many thousands of dollars per month.

A dry-washing plant such as described could no doubt be obtained and placed running on the placers for about \$6000, and would easily pay for itself in a few months. The writer and his associates had about depleted the treasury of their company in paying for machinery and supplies to test the value of the grounds by wet methods, so that the six to ten thousand dollars necessary for the completion of the dry-washing scheme was not forthcoming—in fact we were placed in that not very enviable position aptly described by the Mexicans and used universally in Mexico when forced to abandon an enterprise for lack of funds, *pero falta de recursos*.

The present time is a much more favorable period for operations among these placers, as railway transportation, can be had, from San Francisco to within a few miles of the ground.

Referring again, to the placers, in a geological way, I want to say that my poor abilities, as a geologist, have not as yet, made clear to my mind, the sources of the gold. The total, or almost so, absence of gravel, among the sands, or a boulder and gravelly moraine at the foot of the placers, which might have indicated glacial movements, or the sweep of abraded streams of water, in the very olden time, was apparently not the cause of these deposits. Again it might be that many rich quartz veins underlie the placers, and whose croppings with those of other rocks, towered above the present surface; and that in time the weather-beaten ledges by sun, winds and rains, with occasional cloud bursts gradually disintegrated and abraded the different formations, freeing the gold and depositing the sands, as found at the present time. The bed-rock of the two placers as far as I observed, and that only superficially, was generally composed of a clayey conglomerate of quartz and country rock, without gravel, soft and easily picked, and contained but little gold. Many of the traditions and stories told us by the Indians and Mexicans of the bed-rock, in very favorable localities, being almost covered with gold (and which might easily have been so, had the grounds been formed by stream- or overflows of water,) we took *cum grano salis*. In fact I have found this "grain of salt" idea, to be a very convenient and economical thing to practice on, not only in Mexico, but in many other parts of the mining world.

To the west of Cienega, over the hills and ridges formed by the Teodoro mountains, lie the placers of La Calavera, named from a 30-pound lump of gold found there, which resembled in shape a human skull. From this ground the placers are very much scattered, although the gold can be traced nearly to the eastern

shore of the Gulf of California, quite 50 miles away.

Before deciding on an immediate return to California, we concluded to make a general reconnaissance of the other noted placers of Sonora. For this purpose, we hired a four-horse conveyance in Altar, with driver and guide, and procured an ample supply of arms, prospecting implements, provisions, etc., for a month's trip. Leaving Altar, we journeyed west by south, passing the ancient workings on the placers known as Sombrotita, and which we found to be several square miles in extent, shallow in depth, and hardly to be compared to Los Llanos or Cienega, although there are future favorable possibilities, provided the grounds are ever worked on a grand scale. Continuing our westerly course, we came to the once famous city of Cavora, a well-known place to many Californians, as the scene of the treacherous massacre of General Crabbie and party, by the Mexicans, in 1857.

Cavora is not noted for its placers, but rather for its vein mining of both silver and gold. It evidently had once been a city of some extent and great beauty, as an abundant supply of water made the following of all the agricultural pursuits easy and practical. Although partially in ruins at the time of our visit, much of the interesting and beautiful may still be found to employ the mind and gladden the eyes of travelers. Of the mines themselves, there is little to be said, as we found the old workings in an abandoned and dilapidated condition. At Cavora we changed our course to north by west, and started for the placers of Quitovac, located in the "dead line," in the northwestern part of the State. The town was a mass of ruins, and in possession of a tribe of Papago Indians, with whom we affiliated in a very friendly manner indeed, our guide being a noted chief of that tribe. The placers we found to trend from south to north, some 2½ miles in extent, located in a horse-shoe-shaped basin, nearly surrounded by hills, hardly reaching the dignity of mountains. From the town which is located at the opening in the basin, and at the northern part of the placer, the grounds gently rise to the south, until in a distance of about four miles, an altitude is reached of fully 600 feet, affording, in places, fine sluicing ground, provided water could be obtained. The formation is very similar to that of Cienega, with an abundance of wood and water for steam and living purposes. The water supply comes from never-failing springs, that are to be found in a low, marshy flat, one-half mile north of the village. The grounds at Quitovac prospect well, and there is no doubt in my mind but what a dry-washing plant on a large scale, put in operation there, would meet with profitable returns.

From Quitovac, we still pursued our northerly course, making for the well-known town of Sonora, just south of the boundary line of Arizona, prospecting and examining many old placers, with generally favorable results. From Sonora, we traveled easterly along the boundary line, taking in the placers of Bagnachi, in in Northeastern Sonora; then circling back westerly, through the town of Soni, making casual prospects and surveys on the route; passing through and among the placers of Las Plomosas, Las Muertas, and many others of lesser fame, finally reaching our point of commencement—Altar.

In many other parts of Sonora there are placers of considerable extent and value, notably those of San Antonio de la Huerta, El Refugio, etc., these being river mines, with boulders and gravel deposits, like many of the mining claims in California. As I can claim but little personal knowledge or experience, except among those already mentioned, I leave these placers to be described by tradition, history, or to some writer better posted than myself.

Before concluding, I desire to disclaim any intention to mislead any of our people, and more particularly miners, whose means would bebar them from working any of the placers described, except in a manner similar to that written above. "A poor man's claim" would be hard to find in Sonora. The Mexicans and Yaquis follow all kinds of mining with great intelligence and persistence, tracing veins and placers, like bloodhounds on a trail, and with the help of such poor mechanical appliances as within their reach, they leave but little to be acquired by new-comers except with the free use of capital. CHARLES MARION TYLER, M. & M. E.

THE PIONEER SMELTER.—The Salt Lake Tribune has chronicled the death of the pioneer smelter, of Utah and Nevada, Isaac Grundy, aged 80 years, who died at Minersville a few days ago. When it was learned by the Mormons, back in the fifties, that Johnston's army was coming to Utah, Brigham Young sent Grundy down to Beaver county to prepare material for leaden bullets to be hurled at the army. Grundy went to what is known as the Lincoln mine, and getting out ore, smelted it in a small furnace, and made several tons of bullion, which was sent to this city and molded into bullets. After this he was sent down into Nevada on a similar errand. Grundy is said to have been the first to make bullion in Utah.

IMPORTANT TO MINING MEN.—It will be of interest to mining companies on the Pacific Coast to learn that Commissioner Carter has given instructions to the Mineral Division of the Land Office to disregard local State laws in the matter of mineral holdings by companies incor-

porated under the laws of other States. In California and other coast States, in order that foreign mining companies might obtain mining property, a certified copy of the charter has been required to be filed. The Land Office has been following this custom and required a certified copy of their certificate. Now it is only necessary to show that it has been duly incorporated under the laws of any State.

Forestry at the World's Fair.

Not the least important of the great divisions of the World's Columbian Exposition is that devoted to Forestry. Mr. W. I. Buchanan, Chief of the Department of Agriculture, who is at present in charge of the Forestry Department, has entered actively upon the work of enlisting the various timber and lumber interests, and State Forestry Bureaus in this important feature of the Exposition. Speaking of the matter Mr. Buchanan says:

"I am very much gratified by responses received to letters sent out to State Forestry Bureaus; to the journals devoted to forestry and lumber and others interested in this subject. From the general tone of these replies I am encouraged to believe that the Forestry Exhibit will be very full and complete, and will be one of the most attractive ever shown at any Exposition.

"The importance of this department of the Exposition can scarcely be overestimated. The question of erecting a building for the forestry exhibit, through the co-operation of the various forestry interests in its construction, so as to illustrate in a unique and attractive manner all the woods of commerce in their natural and finished states, is in contemplation and is a question for future determination. The statistics of wood and timber consumption in the United States are full of meaning, and forcibly suggest that the efforts on the part of the General Government and the several States to conserve the forest supply and promote timber culture were inaugurated none too soon and cannot be prosecuted too vigorously. It is intended that the forestry display shall fully illustrate what has been accomplished in this direction, and that State Boards of Forestry will show the most desirable methods of observing Arbor Day, the benefits derived therefrom, and the progress made by them in tree culture. A comparison of notes and a general survey of the situation cannot fail to be interesting, instructive and profitable.

"In a general way, it may be said that the forestry exhibit will embrace wood in its natural state from every section of this and other countries, thus affording a most excellent opportunity for comparing the same varieties growing in different latitudes, and the climatic effect on forest growth. Worked timber in all of its many commercial forms will be shown by beautiful specimens selected from the wood-working establishments of the world, including the various ornamental woods used in furniture, veneers and interior decorations.

"The advance in the science of preparing timber in various ways to resist decay and the encroachments of animal life will be appropriately illustrated. There will be an exhibit of dye woods and barks; of lichens, mosses and ferns; of commercial gums, vegetable ivory, wood pulp, and a curious collection of seeds, and peculiarities of forest growth, such as cypress knees, hurls, etc.

"A good deal of attention will be devoted to forest botany, the distribution of forests, of genera and of species, as well as the anatomy and structure of woods, and the diseases of forest trees and timber.

"Forest management, maps, illustrations and instruments for measuring standing timber; growth of different ages and soils; graphic and other illustrations showing rate of growth; influence of various managements on tree growth; statistics of the lumber trade and of forestry; the harvesting of forest products; the turpentine and charcoal industries, will all receive proper attention.

The Stanford University.

Dr. Jordan has completed his arrangements for the appointment of the Faculty for the Stanford University, and has made the following names public:

Dr. Andrew White, ex-president of Cornell University, to be non-resident professor of history.

E. Stanford, Lake Forest University, associate professor of physics.

Horace B. Gale, Washington University, St. Louis, professor of mechanical engineering.

Professor Joseph Swain, Indiana University, associate professor of mathematics.

Douglas H. Campbell, Indiana University, associate professor of botany.

BLUE LAKES.—Professor Frank Soule has recently returned from an inspection of the water rights and works of the Blue Lakes Water Company in Amador county. He says that at the point in the Mokelumne river where the inlet of the company is established, the stream is a fine, large, wide river of the purest water, fresh from the melting snows of the Sierras. By its rights, the company practically holds control of the stream, which in volume would easily apply the whole of San Francisco, Oakland, Stockton and Sacramento combined. Some of the water is carried along a canal and flows to numerous mines and mills 30 to 50 miles below.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Alpine.

TO BE REOPENED.—Genoa Courier, April 15: Despite the fact that Alpine has been on the down grade, the prospect before the county is a very bright one. There is every indication that several mines will be reopened the coming summer and a general awakening of business is looked for. The Good Hope mine, about three miles above Markleeville, near the river and formerly worked by Will and Frank Musser and Charlie Grover, will be reopened shortly by a man from California. It is stated that the Morning Star or Stella mine, the Colorado No. 2 and the Isabella Tunnel Co. may all resume work in charge of new hands this summer.

Amador.

HARDENBURGH.—Ledger, April 18: The 10-stamp mill of this mine at Middle Bar is nearly completed. W. White, the contractor, expects to get through with the carpenter work next week. The concentrators are on the ground. They are of the Woodward make, which are said to give even better results than the Frue, besides requiring less care in handling them. The course of the ditch that supplies the water has been somewhat changed. Instead of going close to the shaft of the Mammoth mine, it has been carried round the hill, thereby avoiding all danger of seepage into the Mammoth works. At the mine they are taking out some fine-looking ore, which, judging from appearances, ought to pay well. Inside of a month the mill will probably get to work, and set all doubts at rest as to the paying quality of the rock.

NORTH STAR.—The bond of this property expires in June. After the expenditure of nearly \$50,000 in search of a mine, the company is loath to abandon it without further exploration. The discovery of bunches of rich quartz creates the impression that a definite ledge must exist within the limits of the claim. It is likely that an extension of the bond will be asked for, and in the event of such extension being granted, the company will be reorganized, and the ground explored to greater depth.

KENNEDY.—The north shaft has reached a depth of 1350 feet—100 feet deeper than the main shaft. After opening stations at this level, sinking will be commenced on the south shaft, which will also be carried to the same level as the other. The water which was found to be so troublesome in sinking the north shaft, ceased below the 1250 level, and the last 100 feet is comparatively dry. A tank has been put in below the water line, which catches most of the water, and which saves 100 feet of hoisting. The mine continues to surrender liberally in gold, holding the place of the largest gold-producer in the county.

SOUTH EUREKA.—After protracted negotiations the promoters of this venture have at last got the property in shape for the commencement of work. The mine is on Tanner hill, above Sutter creek, and lies on a direct line between the old Eureka and the Oneida mines. It is conceded on all sides to be a very likely location for the opening up of a valuable mine. Arrangements have been made with capitalists below for the necessary funds, in monthly installments, to give the ground a thorough prospecting. It is virgin ground; not a single shaft exists on it. As the entire tract is covered with a bed of lava, supposed to be 100 feet thick, it is a difficult matter to determine the best place to sink the prospect shaft. The apparent line of the lode as indicated by the old mines at either end will probably decide this to a great extent. Surveyors are at work, and in a couple of weeks the era of active mining will be inaugurated upon this promising property.

MISCELLANEOUS.—Forty stamps of the Pacific mill were started this week on a small vein of good ore encountered in the Pacific mine. It is reported that Ballard and Martin, the owners of the New London mine, are negotiating for the purchase of the Alpine mine at Plymouth.

SUTTER CREEK.—Cor. Amador Ledger, April 18: Mining has taken a slight tumble since my last. The North Star Co. have become discouraged and called a halt in the operations. One meeting of the stockholders has been held to decide what should be done, but as the views expressed differed so widely, no conclusion was reached. Some were in favor of coming up to the 600-foot level, and extending the drifts there. It is more probable, if the work is continued at all, that they will conclude to sink another 200 feet, which is generally looked upon as the wisest plan. Work may be abandoned altogether, as some stockholders are not disposed to keep up assessments any longer. It is stated, however, that several moneyed men stand ready to take all the stock that may be surrendered, and continue the work for some time to come. Another meeting will be held shortly, when some definite understanding will be reached. Operations have also come to a sudden standstill at the Lincoln mine. Owing to the late rains, the tunnels, not being sufficiently timbered, have caved in, and as the ore is of low grade, the work of clearing out and retimbering is discouraging. In all probability the lessees will drop the undertaking entirely. They have taken up the plates in the mill, and a thorough clean-up will be made. The Lincoln is regarded as the best mine in Sutter Creek, and all it needs is a strong company to put the shaft in good order, make another sinking, and develop the property in a workmanlike manner. This can never be done by local operators, as it involves too great an outlay. Work at the Mahoney mill is progressing favorably. The tail race has been torn up, and will be replaced with something substantial. The mill has been idle so long that a complete overhauling is necessary before the stamps can be put in motion. Superintendent Tihthets reports on the Belmont mine as follows: The work of reopening the tunnel has been pushed ahead with night and day shifts since February 6, and now the breast of ore has been reached, fully 20 feet in width, and the company have started their 10-stamp mill, working from 15 to 20 tons per day, with good results. The height of this ore breast above the tunnel is between 50 and 60 feet, which has been well prospected by shafts sunk from the surface at intervals north 450 feet, showing a continuous body of ore the entire length. Upward of

30,000 tons of ore is estimated in this body from surface to tunnel, which will now be mined and milled. Work on a level 60 feet below the tunnel is being pushed ahead on the vein, and is in about the same distance north as the tunnel above. The face of this drift is in ore its full width. No crosscutting has yet been done to show the width of the vein at this depth. Ore at this point carries from two to three per cent of sulphurets, and prospects in free gold. The mill is run by water-power, is in good repair, and doing first-class work.

Calaveras.

GLENCoe.—Cor. Chronicle, April 18: The Columbia mine (better known as the Jones mine) has begun operations again and it is hoped that they may meet with success. The mine is owned by Jones & Garland, and is located between Glencoe and Railroad Flat. The small machinery used in operating the mine formerly, has been removed and some larger machinery substituted. A contract has been let to sink fifty feet, and after this has been completed, levels will be run both ways. The mine shows a well developed vein with regular walls, and plenty of the yellow metal. James Enright, the owner of the Bald Eagle mine at Railroad Flat, has purchased eight stamps of the twenty-stamp mill belonging to Mr. Garland, Glencoe's former mining expert, which he (Enright) intends removing to his mine at Railroad Flat. We hope that Railroad's popular first-base man may meet with success, not as a ball player but in his mining interests. F. J. Horswill, who formerly operated on the Norwich mine here, has begun taking down the machinery which he intends removing to Mokelumne Hill.

THE CHILO QUARTZ MINE.—Calaveras Prospect, April 18: During the week we were informed that Hiram Tyer and Tom Stapp, who have been prospecting the Chilo quartz mine, about one mile south of the Calaveras river near J. G. Vote's ranch, had discovered some very rich rock. The owners of this mine have been prospecting for some time. A shaft has been sunk over 75 feet deep, and a few days ago while some work was being done on the surface a quantity of very rich rock was found which was traced along the lead for some distance. The owners of the claim intend to have several tons of ore sent to Selby & Co., to be tested.

TO BE WORKED.—Angels Echo, April 16: There will be considerable work done in this locality during the coming summer. Mining property that has been lying idle for months past will be worked and there promises to be a general revival of mining operations throughout the whole district.

MILL.—Preparations are making for the erection of a 20-stamp mill on the Hallock mine, formerly the Tiberghen mine, situated about a mile west of Angels. Tulloch's concentrators will be used in the mill.

UTICA.—Everything is running in excellent order at the Utica mine, and the 60-stamp mill is kept employed in crushing ore from the stopes of the north and south shafts. The Utica is one of the best mines in the State, and certainly the leading mine of this locality. Nowhere in the State is there another such a vein of ore. The ledge in the Utica averages 60 feet in width, and it is not of the bunch formation, but a solid vein of ore that extends downward and gives every indication of lasting for years to come. A contract has been accepted to sink the south shaft of the Utica 230 feet deeper, which will make the mine 800 feet deep when completed, and the deepest mine in this part of the country. The Utica Mining Co.'s chlorine works, situated in the eastern part of town, are kept in constant operation.

Inyo.

MINING STRIKE.—Index, April 15: Recent developments in the Hirsh mine, Russ district, owned by Nathan Rhine, are of the most encouraging character. The ledge is now four feet in width, with two feet of cube galena averaging 90 ozs. of silver per ton. The rest is made up of a good proportion of honey-comb quartz which prospects well in free gold. About 15 tons of ore is now out and a shipment will be made at an early day. This new strike in the old mine will give an impetus to mining operations all along the Inyo range. Those mountains are full of rich minerals.

Shasta.

UNCLE SAM.—Shasta County Democrat, April 14: It is reported in town that the Uncle Sam mining company have at last cut the ledge in the lower tunnel they have been running for the past seven or eight months, which will give 600 feet perpendicular, of stopping ground, or 400 feet from the level of the old tunnel. The vein, when encountered by the new tunnel is strong eight feet in width, and the ore is said to be high grade. This establishes the permanency of the pay chutes of this camp.

Nevada.

BRUNSWICK CON. M. CO.—Grass Valley Union, April 18: Supt. Fitzgerald's last report to the home office at New York has this to say of the present appearance of the Brunswick Con. mine of this district: "Mine looking well; ledge of same character of quartz as reported before. During past week have made 56 feet of ground, 26 feet in east drift and 30 on west drift. Gained seven feet more of ground by contract than by day work, and at less expense. Have placed in mine a two-foot Pelton wheel and a two-foot fan, which will give all the air wanted and enable us to sink shaft 200 feet deeper. The drifts are being run steadily on full 24 hours' work, and are getting near the ground I expect so much from. Everything looks promising and there is every indication of better prospects as stringers of ore are coming in on hanging wall and crossing the drift. It is a good sign for more quartz. Am taking out quartz and it all looks like pay."

CHAMPION MINE.—The annual meeting of the Champion M. Co., Nevada district, was held on the 14th inst. The official reports were favorable as to the operations of the company. Dividends to the amount of \$25,000 had been paid during the past year, besides \$11,000 for the purchase of the Merri-field property. A dividend of 10 cents per share was declared, payable on the 25th inst.

IDAHO MINE.—Grass Valley Union, April 14: A large station has been cut on the No. 18 level of the Idaho mine, where the fissure is wide, and on the footwall a vein of quartz is exposed that shows liberally in free gold. As this is below the main ore shoot found in the levels above it may prove a very valuable find. The new hoisting works on the eastern end of the location is approaching completion, and the old prospect shaft over which the works are built has been strongly timbered, with a view of

sinking on the lode, which is between two and three feet in size at that point. It is not unlikely that a new pay shoot will be found in that portion of the mine.

THE NORTH BANNER CO. has it in contemplation to add ten additional stamps to its present ten-stamp mill, to increase its crushing capacity, as the mine can now produce more ore than the mill is capable of crushing.

Sierra.

GOOD PAY GRAVEL.—Mt. Messenger, April 18: The Extension Co. raised its second shaft at a distance of 100 feet beyond the shaft where gravel was found at height of 60 feet, and again found gravel, this time after raising 26 feet. Meikle got out and washed four carloads Thursday, in a small prospect dump which he had rigged up for the occasion, and found that it paid \$3 a load. The bedrock at this last raise lies nearly horizontal, and that, in connection with the other facts that the wash is heavy and the pay good, warrants the assumption that the bottom of the channel has been reached. It will be some time before much of a force can be put on, as a large amount of preliminary work must necessarily be done in the way of building dumps and opening breasts, etc.

POKER FLAT.—Cor. Mt. Messenger, April 18: Bunker Hill is employing five men at present. A big future is predicted for this mine. The Liberator mine, situated at Deadwood, is to be started up soon by Sam Miller. The Sunnyside tunnel is in 600 feet in soft, picking bedrock. The indications are that pay is not far off. A rich strike made a short time since, proves that all the mines are not worked out yet. P. O'Donnell, J. Clark and J. Frazer, while out prospecting a few days ago, found a rich deposit which they firmly believe is a break-out of the old Howland Flat lead. They found one nugget weighing ten ounces, besides several others weighing from \$5 to \$50. The finders are jubilant over their good fortune. T. C. Corlett has been sinking an incline on his property, and has found a very rich prospect. Some of the gravel will prospect \$100 to the carload. The Forest Queen Co. is running for the same lead. The tunnel is in about 400 feet, A. Brown and Wm. Jones are working on their claim adjoining the Forest Queen. They are taking out good pay gravel.

Tuolumne.

TUOLUMNE RIVER QUARTZ.—Independent, April 18: Work is commencing on the Tuolumne River Quartz Co.'s mine, near Groveland. The mine is situated on the south bank of the Tuolumne river, near Groveland, about fifteen miles from Sonora. The company owning the property was incorporated March 18, 1891, with a capital stock of \$120,000, in 120,000 shares, at \$1 each. A. B. Cruickshank is President, and Jahez Howes, Secretary, with principal office in S. F. The property consists of a group of twelve gold quartz mines and a mill-site. There has been expended on the Mary Ellen mine (one of the group) and mill-site, \$35,000 in improvements and developments. The Mary Ellen mine and mill-site is held under U. S. patent, and the other under the mineral laws, and subject to patent at any time. The property has been favorably reported on by eminent mining experts and engineers. The mines are very favorably situated on the side of a mountain, thus doing away with expensive hoisting and pumping works, all the ore being run through tunnels; this together with the fact that free water for power can be obtained the year round, enables the ore to be worked very cheap. All the ore so far crushed has realized \$30 per ton, by steam power; but, with water power, the ore can be worked much cheaper. The mine is already equipped with a new 10-stamp mill and all buildings and improvements. The other mines will be developed by tunnels, in bringing in water by ditch and flumes, and other appliances and additions to mill and plant. A. A. Moore, of Sonora, has the contract for the pipe work, and matters will be pushed along the whole line of development as fast as possible.

NEW ALBANY.—Sonora Democrat, 18: The water is being rapidly moved from the 800-foot main working shaft of the New Albany mine, preparatory to mining and milling operations. The new hoisting gear works well. Parties in San Francisco are looking to the Pino Blanco and Hancock mines situated near the Badger mine. The titles having been examined and found satisfactory by Mr. Louis Blanding, the parties will soon visit the mines for inspection and negotiation. Work of development and test has been started on the Alameda mine, situated on the mother lode, by the San Francisco parties having a 90 days bond on it. Mr. Harman of this county is owner. The work is in charge of Mr. Frank McCann. The past record of the mine speaks well for a lasting and profitable property. Work on the Page mine has begun to place it in operating condition by the parties who lately acquired the property. New buildings and mill will be erected on the mine. Drifting is now being done on the 200-foot level of the Badger mine. The ore coming out from the vein, which is four feet wide, is of good paying quality. A shipment of ore will be made at an early day to the Sonora Reduction Works to determine its value in free gold, the percentage of sulphurets in the ore and their value per ton. The parties having a bond on this mine are entirely satisfied with the property. The mine is situated about three miles to the west of the Mother Lode.

Yuba.

SMARTSVILLE.—Grass Valley Union, April 25: A new mining incorporation has been organized under the name of the Syndicate Mining and Development Company, to operate on the Blue Lead at Smartsville. This company will open the ground on the south end of the Blue Lead through a tunnel on what has been known as the "Dunn ground," and will work back into the Mooney Flat ridge. It is expected that pay dirt will be struck in 30 days after commencing work. The company will have about 100 men at work in a short time. The new company will have a location covering one-third of the land, extending from the lower end through to Mooney Flat on the north end, which is being worked by the Ayers Co., and the striking of pay gravel will demonstrate that the lead is continuous for a distance of between two and three miles.

NEVADA

Washoe District.

CONS. CAL. AND VA. MINE.—Virginia Chronicle, April 18: There has been extracted from all parts

of the mine during the week 1482 tons of ore, which was shipped to the Eureka mill. The average assay value of all of the ore worked at that mill during the week (1575 tons) was \$33.80 per ton. Bullion now on hand in our assay office, assay value, about \$31,000.

OPHIR.—The upraise started in the drift run south from the drift run west from the winze, 122 feet below the sill floor of the 1300 level has been carried up 7 feet; total length, 23 feet; and from this opening some ore has been extracted and stored in the mine, the average assay value of which is \$23.50 per ton.

MEXICAN.—The east crosscut, No. 1, started from the main north lateral drift at a point opposite the west crosscut, No. 1, has been extended 30 feet; total length, 661 feet; in soft porphyry formation showing fine lines of quartz.

UNION CON.—East crosscut No. 2 on the 1465 level, started from the north lateral drift at a point 200 feet north from the south boundary line of the mine, has been extended 25 feet; total length, 819 feet; continuing in a hard porphyry formation.

ALTA.—Building a new tank at the mine and overhauling the mill preparatory to the resumption of mining and milling.

YELLOW JACKET.—The usual prospecting work is being done throughout the mine.

JUSTICE.—The north drift on the 822 level advanced 26 feet since last report, and is now out a total distance of 530 feet; the face is in a mixture of clay and quartz. The south upraise on the 490 level was sunk five feet during the week, and has now a total depth of 45 feet; the bottom is in fair milling ore.

OCCIDENTAL.—Extracting ore of fair grade from the 350, 400 and 450 levels. The south drift from No. 1 winze, 600 level, is in 81 feet, the face showing pay ore. The north drift from No. 2 winze, 659 level, is in 274 feet; the face is in quartz and porphyry. Have started a south drift from No. 1 winze, 750 level, in quartz showing some value.

KENTUCK CON.—The south drift from the 1000 raise, east ledge, was advanced 11 feet during the week, and is now out 37 feet; face in low-grade quartz. Have started to open the third set above the track floor in the east crosscut from the north lateral drift on this level. The top is in low-grade quartz on the average, but showing some spots of ore.

BELCHER.—The south drift from No. 2, east crosscut, 300 level, is out a total distance of 174 feet; face in low-grade quartz. West crosscut No. 3, 300 level, has been advanced 34 feet since last report, making its total length 310 feet; face in vein material composed of porphyry, clay, low-grade quartz. The east crosscut on the 1500 level is out 49 feet; face is in hard porphyry.

CHALLENGE AND CONFIDENCE.—The joint Confidence and Challenge west crosscut from the north drift on the 300 level is out 68 feet, having been advanced 6 feet this week. The joint Confidence and Challenge east crosscut from the north drift on the 1100 level, is out 55 feet, 20 feet having been added. The face is in porphyry. The joint Yellow Jacket, Confidence and Challenge north drift on the 100 level is in 694 feet, 33 feet having been made during the week. The face shows quartz having no value.

CON. IMPERIAL.—We are still following up and taking out small streaks of ore from the upper levels and prospecting in and around the old stopes, where we found some fillings and bunches of ore of fair grade, which is shipped to the Vivian mill for reduction.

CROWN POINT.—The south drift on the 300 level is out a total distance of 124 feet, having been advanced 26 feet during the week. At this point it was stopped and a raise started on a streak uncovered in the drift 40 feet south of the stope. The west crosscut, 1000 level, has been extended 12 feet, making its total length 62 feet. It will be continued a short distance farther in order to determine positively whether or not the material in the face is the foot-wall.

ENCHEQUER.—East crosscut on the north line, 600 level, is out 177 feet; face in porphyry.

ALPHA.—The winze 80 feet north of the shaft, 500 level, is down 95 feet; the bottom in quartz yielding low assays.

CHOLLAR.—Northwest crosscut, 60 feet above the 550 level, is in 41 feet, the face in quartz yielding low assays. West crosscut 50 feet south of the north line, 1400 level, is out 21 feet; face in clay and quartz. Joint east crosscut on the north line, 1400 level, is out 65 feet; face in porphyry and streaks of quartz. Milled 542 tons of ore worth \$10.02 a ton, as per battery assays.

POTOSI.—The 1100 level south drift is in south of Chollar incline 57 feet, face in porphyry. The south drift from the winze station, 1300 level, is in 55 feet, face in porphyry and streaks of quartz giving low assays. The winze is down 30 feet below the 1400 level; the bottom is in clay and quartz.

UTAH.—On the 725 level south drift from the main west drift, 140 feet from the shaft station, the incline raise has been carried up 59 feet; total height on slope, 98 feet. The raise is continued in quartz and porphyry, assaying low in the precious metals.

ANDES.—During the week repairs to the north drift on the 420 level were completed and an east crosscut started from the drift. The crosscut has been advanced eight feet; formation principally porphyry. The east crosscut from the south lateral drift on the 220 level has been advanced 16 feet; face in a formation of vein principally quartz.

SEG. BELCHER.—On the 600 level the east crosscut from the south lateral drift is now out a total distance of 248 feet, having been advanced 17 feet during the week. The face is in hard porphyry.

SIERRA NEVADA.—630 level—North lateral drift from west crosscut No. 1, is in 69 feet. West crosscut No. 1 on the same level was advanced the past week 25 feet; total distance, 231 feet, bringing the crosscut 55 feet in the west country formation.

GOULD & CURRY.—200 level: Extracted from old stopes during the week 91 cars of ore. Sent to the Nevada mill 518 tons of ore; average battery assay, \$23.68.

BEST & BELCHER.—1000 level: Have repaired 125 feet of north drift. 1100 level: Northeast drift has been advanced 20 feet through hard porphyry mixed with seams of clay and quartz; total length, 79 feet. 1200 level: All work for the week has been on repairs.

HALE AND NORCROSS.—On the 1100 level of Norcross No. 4 west crosscut near our north boundary was advanced 25 feet; making its total length 195

feet; face in quartz and porphyry. No. 5 east crosscut started on our south boundary was advanced 30 feet; total length, 65 feet; face in porphyry and quartz. The winze started from the end of No. 3 east crosscut, 80 feet south of our north boundary, is down 40 feet. The bottom is nearly all in ore of excellent quality. The main incline is repairing and retimbering 135 feet below the 1400 level station.

SAVAGE.—We have hoisted 773 cars of ore from the 500, 700, 800, 900 and 1100 levels and from the intermediate drifts north and south from the winze below the 1300 level. Shipped to the Mexican mill 557 tons and milled 580 tons; average battery assay, \$17.59. We have bullion on hand amounting to \$10,537.80. The upraise from the 300 level is advanced 154 feet and continues in low-grade ore. On the 950 level the south drift from the station was advanced 33 feet; the face in low-grade ore. On the 1100 level the north prospecting drift from Hale & Norcross side was advanced 20 feet, the face showing stringers of fair-grade ore. The face of east crosscut No. 100 the 1400 level is in quartz and porphyry.

Eagle District.

PROSPECTING.—Salt Lake Tribune, April 17: John Tippet, recorder of Eagle mining district to the Deep Creek country, arrived in the city yesterday. This district is some 25 or 30 miles southwest of Deep Creek station, hence in White Pine Co., Nevada, and embraces part of Eagle range, or Kern mountains. Mr. Tippet has lived there the past seven years, all of which time he has been prospecting, working on his numerous claims and taking out enough ore to keep him and what help he hired. He has shipped mostly from his Harrison mine, located in granite, having a vein three to six feet wide and producing ore that went from 300 to 500 ounces silver, with very little lead or copper. He ran a tunnel on this vein 100 feet, 10 ore all the way except some 10 or 15 feet. On his Anoa he has a shaft down 60 feet, and has taken 100 tons of ore out of the mine which ran from 500 to 600 ounces silver. The vein is 5/8 to 1 foot wide, one-half being rich while the other is second-class, but with a mill would pay well to work. It is chloride ore and hence cannot be concentrated without great loss. The Paymaster produces ore up to 150 ounces silver, 25 per cent lead and carries some iron. This vein is 10 to 12 feet wide and has been opened but little. The Exchange is a new strike of three-foot ore which runs well in silver and some copper. Then there is the Bell which samples 45 ounces silver, but few persons are in Eagle as yet, probably 20 in all, who are prospecting and working on their claims. The Mint is another of Mr. Tippet's properties, 14 miles west of Eagle, in Pleasant valley, and it samples 60 to 150 ounces silver.

Pioche District.

SMELTER.—Record, April 16: With the smelter already in operation, and the two stacks to course of erection, we may look for more lively times the coming summer than has been experienced for some years past. Work at the new smelters at Clafin is being pushed with considerable vim and the new stacks will soon be up. The coming summer will see quite a settlement spring up in that locality.

Tuscarora District.

NAVAJO.—Times-Review, April 16: Stopes on the 350 level are improving, and though the vein is small the ore is of an unusually high grade.

BELLE ISLE.—The drifts from the intermediate crosscut from No. 1 chute, 350-foot level, have been extended 20 feet, still showing some good ore in the face, though not as much as at first. West crosscut from No. 2 chute, same level, extended 16 feet, the face is now entering vein matter.

COMMONWEALTH.—Fourth level: East crosscut has been extended 23 feet in porphyry. North drift from east crosscut advanced 24 feet, face showing some low-grade ore. South drift from same point extended 20 feet in the vein, a large flow of water from both drifts. North drift from west crosscut advanced 14 feet, spar and clay in the face, giving low assays. South drift from same crosscut extended 6 feet, following a small stratum of ore.

NORTH COMMONWEALTH.—First level: Started raise No. 3 from south drift, up 30 feet, cut the vein 65 feet south of the stopes, exposing good ore. Ore extracted during the week was 30 cars first class, average assay \$296 per ton, and 45 cars second class, assay from car sample \$20.70 per ton.

NORTH BELLE ISLE.—East crosscut from north drift, 400-foot level, extended 16 feet; the face shows three feet of vein, 10 inches of it being high-grade ore. Stopes from the 500 level are not looking as well. Have broken nine cars of first class and 73 cars of second-class ore. West intermediate crosscut from No. 3 chute has been advanced 12 feet into the hanging-wall. North intermediate drift from No. 4 chute, 600-foot level, extended 14 feet.

ARIZONA.

STERLING.—Tombstone Prospector, April 17: J. T. Fisher of the Sterling Silver Co. has gone east to confer with his company regarding future operations. He is confident of finding big bodies of ore below water in the Vizina and is also confident of a speedy settlement of some plan to drain the mines. J. P. McAllister maintains that such vast improvements have been made in pumping machinery in the past eight years that \$75,000 will put in an adequate plant to drain the Tombstone mines and keep the water out. Mr. McAllister has made a study of machinery all his life and speaks from practical knowledge. When the Grand Central pumps went up in smoke it was said they could not be replaced for less than a quarter-million of dollars, but that was seven years ago. The mill at Tevis Camp is being worked again and the successful production of high-grade concentrates is again in active operation. This process, it should be remembered, is the dry concentration or Graeger process. The weather being dry no trouble is experienced and dryers will be ready to use when the rainy or moist months come around. Mr. Duncan, who furnished the capital to develop these properties, is strong in his praise of the process of dry concentration.

EMPIRE.—Moberg Miner, April 18: The Empire mine has another large shipment of ore on the dump and vast reserves in the mine, and more being constantly added. Over 100 feet of water has been pumped from the C. O. D. shaft, and it is expected work on the upper levels can be commenced in a short time. Joe Waggoner and Ike Conkey are working on the Illinois mine at Cloride and are taking out some fine ore. The Illinois is the first

south extension of the old Juno mine. The New London mine has been leased to parties who contemplate going to work on it immediately. The New London has heretofore produced hundreds of tons of high-grade lead ore. Shaw & Marshall have leased a portion of the Nighthawk dumps and are getting some good ore. The remainder has been leased or purchased by the Empire mill and the most of it will be run over the Free vanners of that mill. The two winzes being sunk from the 300-foot level of the Cupel mine are in ore of exceeding richness. Owing to an accident to the pump, sinking has been discontinued on the main shaft until a duplicate of the main parts can be obtained. John Barry was in town Monday and Tuesday. He ordered considerable timber and mining supplies for the Sunlight mine. The water has all been pumped from the mine and sinking will be commenced in a few days.

DAKOTA.

A NEW REDUCING SYSTEM.—Deadwood Pioneer, April 14: Yesterday Wells, Fargo & Co. received a large tin pot, consigned to N. L. Anderson, which looked as though it was intended to boil soup in, but which is, in reality, a miniature reduction works, which may develop important results in the way of reducing refractory ores in the Hills. The pot is a reproduction, on a small scale, of the system that has been in use in Montana for some years, and if it will work on the ores in Ruby Basin and Bald Mountain, a large plant will be established in this vicinity. The works, as in operation in Montana, consist of an iron cylinder arranged with four shelves. The charge of ore, consisting of five tons, is dumped, uncrushed, on the first shelf, and subjected to a roasting by means of jets of burning petroleum, while, at the same time, water is sprayed over the charge of ore. As the roasting progresses, the ore is dumped from one shelf to another, until the roasting is completed. Then the charge is placed in an ordinary miller, with a quicksilver plate in the bottom, and the charge passed over it. The gold and silver amalgamates with the quicksilver and pulp is washed off. It is said that a 30-ton plant can be erected for \$2000, and the cost of reducing the ore is \$1.70 per ton. A carload of Ruby Basin ore has already been shipped to Montana for an experimental run and should this system prove satisfactory, large reduction works of this kind will immediately be erected in Deadwood or closely adjoining the city.

SQUAW CREEK DISCOVERIES.—Deadwood Pioneer, April 15: The late strike of carbonate of lead ore on Squaw creek, a stream that runs through the country that lies between the Etta tin mine, and Hermosa, created considerable excitement, and as soon as it became known 150 or 200 men rushed to the scene and soon had all the ground in the neighborhood located. Outside of the first discovery very little similar ore has as yet been found. It is the opinion of some of those who have visited the place that it probably came from a chimney. The ore runs pretty high in lead, and fair in silver. It is to be hoped that on some of the other claims the same kind of ore will be found. If there is one thing more than another that is wanted in this country, it is lead.

IDAHO.

DELAMAR.—Idaho Statesman, April 15: Geo. Drake, one of the contractors on the lower tunnel, says they have been making excellent progress with their work, having run 170 feet during the past month. They are still some distance from the main ledge, but have cut through several small ledges of good quality. On the 4th inst, the DeLamar property passed from the hands of Capt. DeLamar into the control of the DeLamar Gold Mining Co., limited, the final transfer having been made on that day. Mr. Werteweller arrived on the 2d, and represented the company in the transaction. Mr. Bratnaber also came in on the 4th, and has assumed charge of the property for the time at least. Mr. Plummer is expected here about the last of the month, when, it is rumored, he will be installed as general manager. On the 4th and 5th, the stamps were hung up and the final cleanup for Capt. DeLamar was made, the net results being something over \$100,000. The mill was immediately started up again crushing ore for the new company, and is already pounding out dividends for the stockholders. On the 4th and 5th a complete inventory of all the property belonging to the company was taken. No changes of importance have followed the transfer of the property, and none are likely to occur until the general management has had time to digest their plans and settle on a line of procedure.

THE MAMMOTH MILL.—Wardner News, April 11: The old idea of being obliged to visit some other place when in search of news from home has been amply exemplified during the past month by the accounts published in the numberless newspapers both in and out of the State regarding the starting of the new concentrating mill of the Bunker Hill & Sullivan mining company. The Spokane papers have recorded it as being in full blast for a month, while other journals nearer home have had the mammoth works in operation for nearly two weeks. The fact is one half of the plant was set in motion during the week to test the machinery which was found to work like a charm and the entire works will commence permanent operations about next Monday. When all the necessary arrangements for starting have been completed, and the largest mill of its kind in America begins to concentrate, the News will give an account of its workings.

THE ARGENTINE MINE.—O. M. Lonsdale one of the owners of the Argentine mine located near Osburn, said on Wednesday last when interviewed by a Review reporter in Spokane that the mine, which has been shut down for two years because of a misunderstanding of the stockholders, will be opened up in about six weeks. The Argentine is one of the mines in the Coeur d'Alenes that has been well developed, but the length of time that it lay idle put it behind the others in production of ore. The work of completing a 400-foot tramway that was destroyed by a snowslide this winter has just been done, and the mine will begin operations with a force of half a hundred men. It is a dry ore mine, the rock running 60 ounces in silver and about \$6 in gold. The Last Chance Mining Co. have just added to their mill one of Clark's

improved slime tables. This new improvement on the old method is the invention of Edward W. Clark of Butte, Montana, who is now here superintending the putting of his table in place.

ATLANTA MINES.—Gilmore Bulletin April 18: Again the report comes to us that the sale of a group of Atlanta mines has been perfected by Judge V. S. Anderson, the purchasers being a London syndicate and the price \$3,500,000. These claims were owned by 25 or 30 men, mostly residents of Atlanta, Rocky Bar and Boise City, and we predict that each locality will feel beneficial effects when these "old boys" receive their share of the English coin. Judge Anderson departed from New York for London on the 15th instant to close the bargain, and Lawyer Sam McCarty informs us by telephone that all necessary papers are now on file for record in the County Recorder's office.

MONTANA.

GRANITE MOUNTAIN OUTPUT.—Mining Journal, April 15: The output of the Granite Mountain Co. for the past week aggregates 44 bars, containing 66,000 ounces silver and 158.4 ounces gold.

THE EXEMPTION SUSPENDS.—Pending the raising of a fund sufficient to sink the shaft 140 feet deeper, work on the Exemption at Butte has been suspended. At a depth of 60 feet, which is the point reached before the work was discontinued, the ore body is said to show 3 1/2 feet in width.

A SEVEN THOUSAND DOLLAR BONUS.—It is reliably stated that Humphrey & Richardson, who recently bonded the Carter, at Barker, for a continuing consideration of \$15,000, have transferred their claim to John Sinclair and others of Great Falls for \$22,000, receiving, therefore, a bonus of \$7000. The Carter is owned by Ed Zingler and John Clifton and bids fair to become a bonanza. It is an extension of the Paragon.

WILL ACTIVELY DEVELOP.—The El Dorado Co., operating just west of the O. R. & N., in Missoula county, has determined to commence active development of its property at once. From the surface showing, as well as its environments, the claim is regarded as of unusual promise. It carries two leads which come together and cross within its lines. One of these, the King & Queen vein, carries grey copper and runs northeast and southwest. The other, the Keystone, carries steel galena, and runs east and west. The King and Queen to the west has a shaft 300 feet deep, with eight feet of solid ore at the 150-foot level and 14 feet at the 300.

THE HELENA SMELTER.—Mining Review, April 17: As an additional evidence of the flourishing condition of the mining industry in Montana, we are informed that the sum of \$100,000 will be spent this spring in constructing additions to the Helena smelter, which has already cost a half million. This concern is now running to its full capacity, but the ore resources from which it has to draw being so numerous and the returns so great, it has been decided to enlarge the plant at once. This addition will make the Helena smelter one of the most complete in the world.

CASTLE MINING DISTRICT.—Inter-Mountain, April 16: E. P. Snydam, the energetic mining man of Castle, brought in a box of samples to-day from a group of mines in which he is interested. They are located in the Four mile camp of the Castle district and include the Granite Mountain, Myrtle and other well-known claims. The ore is on exhibition at the office of W. D. Fenner & Co. Mr. Snydam recently made a map of the mining claims in the Castle district with a statement of the development and ore in sight which is very valuable. He says the mining men of Smith's camp contemplate building a smelter for treating the ores of the Judge, Bondholder, Legal Tender and Alice mines. A custom smelter, he says, would do a great business. The Cumberland smelter is being rapidly built and everything about Castle has the appearance of life and activity. About 1,500 people are now around the camp.

OREGON.

PLACERS.—Bedrock Democrat, April 18: More than the usual activity in mining circles is manifest this spring and while the weather has not been so favorable for the placer miner, there seems to be no reason for uneasiness. The days and nights have been cold and the snow is melting slowly. But, then, it is a backward spring and judging by the experience of the past all things will yet turn out favorable. A few days of sunshine will start the flow of water from the mountains and as there is a large quantity of snow banked up in the ravines and gulches the water season promises to be a lengthy one. From all the different camps throughout Baker and Grant counties the reports are favorable for an unusually large output of the precious metal and it is safe to predict that the placer mines will figure prominently in bringing about a lively fall trade.

WASHINGTON.

THE TOUGH NUT.—Ruby Miner, April 15: The bonding of the Tough Nut, which was reported as very probable in the last Miner, has now been consummated. The price is \$45,000, to be paid in eight months. The purchasers are California miners, represented in this country by Col. Wallace. The Californians will also make other large investments in Okanogan this season, as soon as Col. Wallace arrives and looks over the ground. The Tough Nut is the pride of Conconully, and is developed by 275 feet of tunneling and a 35-foot shaft. The face of the tunnel shows 10 feet of ore, and at the bottom of the shaft is four feet of high-grade galena and gray copper ore. Work is to be immediately instituted on the mine, and will be continuously prosecuted in the hands of the new management.

Recent Additions to the State Mining Bureau.

Specimens of cassiterite ore from the following tin mines in New South Wales: Brickwood, Uralla district; Pleasoot Creek, Clarence district; and from the Thompson, the Ruby Hill and the Torrington claims at Emuville; also from the same country, quartz crystals with included cassiterite, from Dutchman's Reef, Emmaville; quartz, showing free gold, from Peak Hill; chalcopryite, sulphide, redurbitite (sulphide of copper); native copper, malachite and azurite from the Cobar district; also, pyromorphite

with argentiferous galena; native silver, cerargyrite, native copper and rich chloride of silver from the Broken Hill district, with danaita erythrite from Shaw, near Carcoar; topaz and graphite from Tenterfield, and stibnite from Corangula, near Kempey; coal, with fossil resin, amburite, Bay of Islands coal field, Russell, N. Z.

Cadia nugget, found in 1885 at Cadia, near Orange, N. S. W.

Platypus nugget, Robinson Crusoe, Gully, Bendigo, Victoria, 3376 ounces 6 pennyweights, 1508, found in 1861 five feet below the surface.

Viscount of Canterbury nugget, 1121 ounces to pennyweights, 44420, found at John's Paddock, 1870.

Model of "Thunder" meteorite stromeyerite, J. V. Copeland.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

GLOBE VINEYARD CO., April 11. Object, cultivating vineyards. Capital stock, \$100,000. Directors—G. M. Lawton, F. Butterfield, E. S. Poble, C. M. Foster, Thos. Sheridan and C. D. Coon.

OAKLAND PRESERVING CO., April 11. Capital stock, \$100,000. Directors—F. Tillman Jr., J. H. Mangels, C. W. Pike and E. A. Denicke.

BIG BEND LAND AND WATER CO., April 11. Capital stock, \$2,000,000. Directors—D. P. Merrill, R. H. Hudson, T. D. Slaven and Beverly S. Taylor.

GORDON ORCHARD AND VINEYARD CO., April 11. Capital stock, \$50,000. Directors—John Cushing, M. M. Johnson, M. V. Cooley, G. M. Stof and E. E. Bush.

ELECTRIC STORAGE AND SUPPLY CO., April 11. Capital stock, \$50,000. Directors—Leon M. Hall, Geo. C. Jensen, Leo S. Robinson, W. B. Josselyn and C. B. Lankeman.

FRIEST VALLEY COAL CO., April 13. Capital stock, \$1,000,000. Directors—A. J. Robinson, F. Sletcher, N. K. Goddard, G. S. Brown and Wm. Strader.

PACIFIC SUIT CLUB, April 13. Object, "to supply the club with suits of clothes." Capital stock, \$10,000. Directors—Geo. L. Maguire, Ferdinand Young, J. M. Searcy, A. Durand, J. H. Maguire and Chas. S. Mix.

ARC AND INCANDESCENT LIGHT CO., April 14. Object, to manufacture, sell and supply electric power and light to the city and county of San Francisco and its inhabitants. Capital stock, \$1,000,000. Directors—J. P. Martin, Frederick M. Pickering, A. J. Bowie, Louis T. Haggin and Irwin C. Stump.

OAKLAND SYNDICATE IMPROVEMENT CO., April 16. Object to reclaim, by filling in, several thousand acres of land north of the railroad mole, west of Sixteenth street, to build warehouses, construct railroad tracks and make Oakland the great shipping point of the coast. Also, the introduction of pure water. Capital stock, \$10,000,000. Directors—George C. Perkins, Eli S. Denison, W. E. Dargie, A. D. Wilder, George T. Hawley, F. Chappell, J. T. Carothers, D. W. C. Gaskill, L. W. Kennedy, Robert McKillian and R. M. Fitzgerald.

MALLARD UNDERTAKING CO., April 17. Capital stock, \$20,000. Directors—W. H. Kelly, A. Olsen, E. Sweeney, S. C. Walsh and M. Savage.

COSMOS IMPROVEMENT CO., April 17. Capital stock, \$100,000. Directors—S. F. Long, L. Vincent, L. G. Schord, T. O. Jephson and F. N. Belgonia.

TILLMANN CANNING CO., (Oakland) April 17. Capital stock \$100,000. Directors—F. Tillmann Jr., Thurlow McMullin, E. A. Engelberg, W. K. Braskett and C. P. L. Leichter.

CALIFORNIA TRANSFER CO., April 18. Capital stock, \$100,000. Directors—C. M. Goodall, W. D. O'Kane, J. Gaffney, A. H. Evans and F. G. Brown.

NATIONAL PUBLISHING CO., April 20. Directors—A. M. Hinman, E. F. Brown, L. M. Babcock, B. O. Hodge and C. E. Griggs.

BUREAU OF EQUIVABLE COMMERCE, April 20. Capital stock, \$1,000,000. Directors—C. K. Teed, G. C. Ludington, R. O. Shear, I. R. Marston, E. C. Hamilton, M. E. Knight and T. P. Marston.

GEORGE OSEAR COAL M. CO., April 20. Capital stock, 1,000,000. Directors—G. R. Tolman, C. B. Adams, A. S. Hulbard, W. L. Higgins and C. F. Brown.

SYNDICATE M. CO., April 20. Capital stock, \$500,000. Directors—A. P. Campbell of Rough and Ready, Nevada Co., J. O. Bushby of Marysville, C. W. Kitts, of Grass Valley, J. C. Turner and F. W. Eaton of San Francisco.

EL DORADO SUGAR REFINING CO., April 22. Capital stock, \$1,000,000. Directors—E. L. G. Steele & Co., E. L. G. Steele, G. A. Moore, Ed. Polhemus, Emmett W. Bee and M. H. McAllister.

PACIFIC REDUCTION WORKS, April 22. Object, to reduce ores. Capital stock, \$1,000,000. Directors—P. A. Campbell, M. C. Jewell, A. Owens, M. C. Walton and John T. Dawes.

KOOPMAN WINE CO., April 22. Capital stock, \$150,000. Directors—G. W. Hendry, G. R. Jones, C. T. Bridges, G. W. Vaughan and G. J. Koopman.

LONA PRIETA PRUNE RANCH CO., April 23. Capital stock, \$12,500. Directors—C. T. Dean, W. H. Quinn, J. A. Thompson, G. J. Buckland, F. Norton and A. E. Kellogg.

MORSE M. CO., April 22. Capital stock, \$1,000,000. Directors—J. A. Canfield, Vernon Wilson, H. P. Blanchard, W. R. Shilling and O. C. Pope.

CAMPBELL INVESTMENT CO., April 21st. Capital stock, \$150,000. Directors—Amy S. Joos, Jesse H. and Donald Y. Campbell, Ellen O. and W. C. B. de Fremery.

PHELPS & ARNOLD CO., April 21. Object, to deal in hardware. Capital stock, \$200,000. Directors—Alanson H. Phelps, Henry A. Arnold, Albert A. Phelps, Jobo M. Arnold and Charles J. Nickerson.

A COMPANY has been organized to more systematically explore the oil-field north of Los Gatos, Santa Clara Co.

COMSTOCK mines produced last week 5035 tons of ore, yielding \$107,932. The total weekly yield is largely increasing.

MECHANICAL PROGRESS

Iron Not Yet Obsolete.

There is no question of greater importance than that of the merits respectively of iron and steel as materials of engineering construction. It is a mistake to suppose, as some persons do, that the dispute has been settled in favor of the latter metal. There have recently happened some noteworthy events to strengthen the belief that iron is by no means dispossessed of its inheritance of use. First, the increased output of ironstone in 1888—as shown in the mining statistics just published—shows that the output of manufactured iron must be an increasing one. Then the decision of Lloyd's Committee with regard to the use of iron in shipbuilding, and the fact of the continued employment of iron for bridge construction, are proofs further of the tendency in question.

At a recent meeting of the South Staffordshire Iron and Steel Institute a very suggestive discussion took place upon the value comparatively of iron and steel in boiler construction. The testimony of those who took part in the discussion was, as is usual in such cases, of a somewhat contradictory nature. While one set of disponents argued in favor of the use of steel for boiler plates, and stated in brief the trustworthiness of this material, other speakers became eloquent about the refusal of certain steel makers to use that metal in the boilers employed at their own works, and pointed to the large prices—as much as £400 in certain instances—paid for single boilers in the construction of which iron was exclusively used.

When metal makers differ it is difficult to decide. But the truth in this, as in many other arguments, lies probably in the middle. As was pointed out at the close of the discussion, both steel and iron will give excellent results when they are separately used. When they are employed in conjunction in the same boiler, and when brass fittings are present, an electrolytic influence is brought to bear, which leads to corrosion of the steel. Again, when tie rods of manganese bronze and phosphor bronze and similar materials are used, electrolytic action is often set up, and the steel plates have been found to be corroded in proportion to those particular points. There seems to be no reasonable doubt that steel is more susceptible of corrosive action than is iron; but, on the other hand, the former metal has many virtues not belonging to the latter. For ourselves, we do not believe there is that rivalry of the two metals that is sometimes spoken of. We expect to see the best Yorkshire and Staffordshire iron in no less request 20 years hence than it is to-day. The qualities of the two metals will gradually be shown up; but we do not expect to see either supersede the other.—*Colliery Guardian*.

The Fusion of Iron.

In the *Metallarbeiter* were recently appeared some observations on the behavior of iron in smelting and casting. It was pointed out that the metallurgical processes by which iron is extracted from the ore, produces at the first running a metal which is chiefly iron, but which also contains carbon, silicon, manganese and other substances. These are impurities; but they have their uses in lowering the melting point of the metal. Pure iron, from its very high melting point, is not well adapted for foundry use. The pig iron, with its high percentage of carbon is much more convenient for castings. When pig iron is re-melted in a cupola, air is brought into contact with the metal and the carbon mixed with it. Part of the carbon is oxidized, and the other impurities such as silicon and manganese together with a small quantity of iron are oxidized and drawn off as slag. Other products of oxidation, carbonic oxide and iron oxide, are dissolved in the molten metal. The aqueous vapor of the air employed in the cupola blast is decomposed into the oxygen and hydrogen; the first of which goes to oxidize the fuel and metal; the latter is dissolved in the metal. Iron possesses the property of absorbing, in the molten state, three times its volume of hydrogen. As the metal cools, the occluded gases (hydrogen and oxide) are set free, leaving traces of their presence in the spongy, porous surface frequently found in solidified masses of metal.

When the molten iron, containing these gases, is run into a mold, the gases are liberated into the casting. This is especially the case when the metal is run at a low temperature. The gases are best eliminated by making the iron very hot, and stirring it well in the ladle before filling the molds. Iron when re-melted has a greatly increased power of absorbing gases and iron oxide. For homogeneous castings it is necessary that all pig iron should be used, without admixture of old castings. Spongy castings are also caused by an improper moulding material which leads to the formation of surface cavities. The bubbles produced by dissolved gases, however, have a bright metallic surface while those due to the molds are covered with a dull film of oxide.—*Boston Jour. of Com.*

ALLOTROPIC FORMS OF METALS.—Writing on some curious properties of metals and alloys, Mr. W. C. Roberts-Austen remarks that the importance of the isomeric and allotropic states has been much neglected in the case of metals. Joule and Lyon Playfair showed, in 1846, that

metals in different allotropic states possess different atomic volumes, and Matthiessen, in 1860, was led to the view that in certain cases where metals are alloyed, they pass into allotropic states, probably the most important generalization which has yet been made in connection with the molecular constitution of alloys. Instances of allotropy in pure metals are: Bolley's lead, which oxidizes readily in air; Schutzenberger's copper; Fritzsche's tin, which falls to powder when exposed to an exceptionally cold winter; Gore's antimony; Graham's palladium and allotropic nickel. Joule has also proved that, when iron is released from its amalgam by distilling away the mercury, the metallic iron takes fire on exposure to air, and is, therefore, clearly different from ordinary iron.

How to Sharpen a Screwdriver.

The screwdriver is found not only in the tool-chest of every mechanic, but in most houses, and in not a few offices. It ranks with the hammer, the saw and axe in general utility, and yet very few persons know anything about how it should be sharpened so as to do its work most efficiently—that is, with the least expenditure of power and the least injury to the head of the screws.

In driving a screw into wood, the force used to press the screwdriver against the head of the screw tends to aid the latter in penetrating the wood; but when we attempt to extract a screw, every pound of pressure that we apply tends to render it more difficult to get the screw out. It therefore becomes very important that the screwdriver should be so formed that it may be kept in the nick of the screw by the exertion of the very least degree of force, for if it has any tendency to slip out, we can keep it in place only by applying pressure, in which case we run great risk of injuring the nick and rendering it impossible to draw the screw.

If we examine a screwdriver in the condition in which it is ordinarily found, we shall find that it presents a section in which the sides of the wedge, in which all screwdrivers terminate, are curves with the convex sides outward. Now, the effect of thus curving the sides of this wedge is to render it greatly more obtuse. Moreover, when we turn the screwdriver, the tendency to slip out of the nick is just in proportion to the obtuseness or bluntness of the wedge, and therefore this form is the very worst that can be chosen. In the hands of most good workmen, therefore, we find that the screwdriver ends in a wedge of which the sides are perfectly straight. This is a very good form, but is not equal to a form in which the sides of the wedge are curves but with the concave sides turned outward. In this way we lessen the obtuseness of the wedge at the extreme point, and produce a turn-screw which may be kept in the nick by the least possible pressure endwise. To grind a screwdriver into this form, it is necessary to use a very small grindstone, and many of the artificial stones found in market answer admirably. Many mechanics would find it to their advantage to keep one of these small grindstones for the purpose, as it could be run in the lathe with very little trouble.—*Technologist*.

STRENGTH OF LEAD PIPE.—Lead pipe will sustain quite a heavy pressure, if it is applied without shock, but in all practical work, in the plumbing of houses especially, the column of descending water suddenly stopped by the closing of a faucet, exerts an increased pressure that will burst pipes which would stand a very much larger weight of still water. Air-chambers should always be employed, where practical, to act as cushions to take up the shock. In a lead pipe, when sudden shocks are created by suddenly cutting off the water, the pipe will generally commence to swell at its weakest point, and thus continue until the power of the pipe is so reduced that at some sudden shutting off the pipe gives way.

SUPERIORITY OF IRON OVER WOOD FOR RAILROAD TIES.—The greater smoothness secured in railway travel by the substitution of metallic for wooden ties is causing their increased introduction in a marked degree. The tie most preferred is a metallic trough, in which the rails rest upon a wooden block, thus avoiding metal contact, and are clamped firmly and securely in place without the use of fish plates or angle bars.

THE TACK INDUSTRY.—Several attempts have been made to establish the tack industry in the South, but they have failed from difficulties in handling the material. The branch of the iron trade is in the hands of New England manufacturers, and is practically confined to Massachusetts. More than two-thirds of the tack business is controlled by that State and fully three-quarters by all of New England.

MATCH-MAKING MACHINERY.—Ingenious machines for the various operations of manufacturing matches have been in use in Scandinavia for some time, and more are expected. Machines for packing the matches have recently been introduced, one of these—the invention of two young Norwegian engineers—having a capacity of 1000 boxes per minute.

A DOUBLE TIRE WHEEL, with springs between the outer tire, is the subject of a recent patent granted in British Columbia.

SCIENTIFIC PROGRESS.

The Mysteries of the Nerves.

It is said that a Philadelphia surgeon has dissected and mounted the complete nervous system of a human being—something never before accomplished. This, however, pertains only to the physical condition of the nerves; but they have a vital action which seems to be in far more immediate connection with the mind or soul than any other portion of the system. We condense as follows some interesting remarks upon this peculiar relation of the nerves:

When we find out the secret of the nerves we shall probably have discovered the secret of life. We shall then, perhaps, know something of the soul, whose very existence is now disputed, and we shall be able to formulate some definite opinion in regard to immortality. Science is slowly moving onward toward that point, and seems at times to have some clew to the mystery. The study of physiology, physical and mental, is little more than the study of the nerves, simply because the nerves are intimately connected with health of body and mind. In cases of prolonged diseases, as long as the nervous system is not completely shattered, there is hope. When the nerves refuse to act, the will, which is the resistant power in the human being, ceases to act also, and death finds an easy prey. There are persons attacked with what seems to be a mortal disorder who obstinately refuse to die. A certain amount of nervous force comes to their relief, which acts on the physical functions and brings back the prostrate individual seemingly from the gates of death.

Sometimes this restoration of sick persons to health seems like a miracle, and there is little doubt that many so-called miracles have been the result of an affluence of nervous force coming from a sudden excess of hope or shock to the system, emanating from no matter what source. Did the alleged saints in the first centuries of the Christian era ever cure the sick? Was a sick man ever restored to health by the touch of a king? Was there ever such a thing as a faith cure? Cures have been performed by each of these means? And yet it is not necessary to suppose that there was any occult power in either saint, king or apostle of faith cure. The whole secret lay in the psychological state of the sick person, in whom confidence in the means, and hope combined with latent nervous force, conspired to set the vital functions again in motion.

The pathological phase is only the border land of the mysterious subject. On the phenomena of the nerves, magnetism, spiritism and hypnotism have erected theories involving a host of strange illusions, but conveying also scientific facts of value. A spirit medium is only a being endowed with exceedingly sensitive nerves. A nervous subject may be hysterical, epileptic, or the victim of hallucinations of various kinds which result in eccentric actions or abnormal physical conditions. The nervous system of some of these persons is in such an excessively morbid state that an external sensation, such as a sudden noise, the ticking of a watch, a pressure on the body, contact with a cold or warm body, a breath, a ray of light, the reflection of some bright object, suspends animation. The subject falls into a sleep, which lasts for a longer or shorter time, and wakes to forget everything that has passed during this period, though it may have continued several weeks. The Witch of Endor was probably a mere bundle of nerves—a spirit medium of Bible times. The Pythoness of Delphi was a hysterical or epileptic capable of extreme nervous exaltation. The witches and sorcerers of the Middle Ages were in many cases the victims of nervous attacks which those about them sincerely believed to be caused by divine or demonic inspiration. In the light of modern science, these characters and events are seen in a less mysterious light.

Several original cases involving hypnotism have, within the last two years, appeared in French courts, and hypnotism is now regarded in France as so dangerous that the Minister of War has forbidden its practice by army physicians. The subjugation of one person to another's will, the dual state in which the subject seems on the confines of another world, is caused by a disorganized nervous system. Even genius, especially poet genius, is stigmatized as an unhealthy psychological state. Everything that is not the duldest and plainest prose of life seems in the process of being transformed into morbid conditions of the body. Does it render a phenomenon less mysterious to prove that it is physical? An object falls to the ground by the law of gravitation. Do we understand that marvelous law better because we constantly see its operation? Chemical atoms attract or repel one another in virtue of a universal law of whose hidden force and meaning we have not the remotest conception. But we are consoled when we discover that something in nature falls within the domain of natural. The phenomenon is classified, but has by no means ceased to be a mystery.

AMMONIA WATER AS A FIRE-EXTINGUISHER.—Considerable alarm was occasioned at Queensferry, near Hawarden, recently, by a serious explosion and fire at the works of Messrs. J. Turner & Co., chemical manufacturers and tar distillers. A still charged with anthracene oil, ten tons in quantity, exploded with terrific

force, owing to the choking of the worm, and shot a volume of flame skyward that illuminated the district over a wide area, and was visible ten miles off. The burning oil scattered itself over the yard and to the pitch house adjoining, where hundreds of tons of pitch were stored. The pitch ignited, and the conflagration assumed alarming proportions. Luckily all the day men had just left the works, but three who had been left were burned. The Sandycroft Fire Brigade was promptly on the spot, and, by using ammonia water from a 50,000-gallon tank, they subdued the fire in an hour and a half.—*Journal of Gas Lighting*.

THE OHIO RIVER OLDER THAN THE MISSISSIPPI.—According to an article in *Popular Science Monthly*, for April, written by Joseph H. James, it appears that the Ohio is an older river than the Mississippi. Mr. James writes as follows: An examination of the geological structure of the country through which the Ohio flows shows none but the extreme end of the valley to be of later age than the Carboniferous era. Portions are, indeed, far older; but the area covered by these, though perhaps extensive enough to allow the development of some system of drainage, was never large enough to develop a stream of any great size. None of the tributaries of the river, either from the north or the south, flow through regions more recent than the Carboniferous, with the exception of the lower parts of the Ohio itself and the Tennessee, which border on the Quaternary. The lowest formation in the valley is the Cincinnati, which is just touched at a single point, and only for a short distance, about 20 miles above the city. It may be stated then, that since the close of Carboniferous time the river has flowed mainly in the same channel. The vast antiquity of the river is thus easily established, and the existence of the wide valley, with its broad bottom lands, is readily accounted for. The story of the river during the long period of preglacial time would be simple. For ages its waters were probably poured directly into the Gulf of Mexico, an arm of which extended northward into the continent at least as far as the present site of Cairo, Illinois. In later times the Mississippi-Missouri began the formation of a delta, which, gradually extending, has left the Ohio a tributary merely of the mighty "Father of Waters."

A LOCK FOUR THOUSAND YEARS OLD.—An Egyptian lock has been found which was in use more than 4000 years ago. The old Egyptian lock was not made of metal, like those we use now—days, but of wood, and the key that opened it was wooden, too. On one side of the door to which it was fastened there was a staple and into this staple fitted a wooden bolt that was fixed to the door itself. When this bolt was pushed into the staple as far as it would go, three pins in the upper part of the staple dropped into holes in the bolt, and held it in its place, so that it could not be moved back again until the pins were lifted. The key was a straight piece of wood, at the end of which were three pegs the same distance apart as the pin which held the bolt firm. When the key was pushed into the bolt through a hole made to receive it, the pegs came into such a position that they were able to lift the pins that fixed the bolt, and when these were lifted the bolt could be lifted out of the staple.—*Trade Mail*.

HOW THE MUSKRAT BREATHES UNDER ICE.—Animals that breathe by means of lungs can prolong their stay under water only through special anatomical arrangements, or by having recourse to some extraneous means. Mr. W. Spoon of the Elisha Mitchell Society, who has hunted the muskrat in winter, asserts that the animal, when obliged to traverse, under ice, a pond so wide that it cannot keep up its breathing, stops from time to time and exhales their from its lungs. This air, being confined by the ice, becomes oxygenated in contact with the water, and the animal, taking a fresh inspiration, dives in order to begin its swimming again a little further along. It appears that other observers have found that if this air is dispersed through the ice being struck, the animal is killed through asphyxia.

MAGNETIC ROCKS.—At the Royal Academy of Lyncei on Dec. 18th, says the *Electrician*, Signors Sella and Oddone gave an account of some researches on the distribution of magnetism in certain regions on the Alps. They have found a number of magnetic foci, and record that the rocks which present distinct magnetic properties are magnetite, serpentine, diorite, melaphyre, and syenite. A magnetic rock was observed by Signor Sella on Punta Ginfetti, in the Monte Rosa group, and as it presented traces of fusion on its surface, as if it had been struck by lightning, it is suggested that this circumstance has endowed the rock with its magnetic properties.

THE UTILITY OF THE MICROPHONE for observation of earth tremors and noises is becoming generally recognized. Italy has for some time held a foremost place among the nations which have taken advantage of the special adaptability of this instrument. It is also now found that photography possesses admirable capabilities in the way of supplementing the work of the microphone in making these delicate records.

LENGTH OF DAYS.—The longest day of the year at New York is 15 hours, at London 16½, at Hamburg 17, at Stockholm 18½, at St. Petersburg 19, at Tornea, Finland, 22, at Spitzbergen 23 and one-half months.

GOOD HEALTH.

The Sugary Watermelon.

The following, from an old exchange, will be read with interest in view of the approaching season for indulgence in melons and fruit:—It is delightful to have science spare here and there a tree of love and old fancy. There has been such a sweeping and mowing down of human comforts that we once at least esteemed as such, in regard to eating and sleeping and the general manner of living, that it has seemed at times that the sanitarians and the scientists were determined to convert us into the veriest machines, and leave us nothing of the sweet and old-time indulgences that in the innocence of youth and the maturity of age we thought to be harmless.

For instance, we have been told that the watermelon is "aquish" that it contains but a very small percentage of nutritive elements—as if man must indulge in nothing except with an eye single to the brawn of his composition; that the melon is a seed and home of malaria, that convenient esopogon for every ill not otherwise defined; that, in short, the less of the rich, ripe and toothsome melon we eat the better for us. Such has been the gospel of science, or at least of preaching by a grand army of advisers, that the small boy has heroically defied and grown up to stout manhood "just the same."

Now, after many years, the scientists settle down to the doctrine that the watermelon is not dangerous to health, provided always we wrestle with this filling and luscious fruit of the field when it is fully ripe. That, indeed, its action upon the secretive organs is rather beneficial than otherwise, unless our indulgence degenerates into the glint of intemperance; that more of melon and less of meat in the summer season, is decidedly beneficial. As for the age they now tell us that there is no more of that shaking ill in the dripping sugary melon than in any other fruit, and there is none in any if it is taken at the right time and in due moderation. Unfortunately we do not know who to thank for this generous advice, and this overthrow of a bngahoo that has occasioned many a boy exquisite tortures because of enforced abstinence. But as an integral part of the grand army of melon lovers science has our thanks."

HAS EVERY DISEASE ITS REMEDY?—The theory that for every disease there is a remedy, if we could only find it, is as pleasing as it is plausible. It labors under the doubt-inspiring fact, however, that it is of a *priori* origin. So many speculative hypotheses of this kind have been scattered to the winds by the labors of the inductonists that one is sometimes tempted to take up the unphilosophical position that whatever rests solely upon an *a priori* basis must necessarily be false. That would of course be absurd. But is it the case, as matter of fact, that for every disease there is a remedy, if it could only be found. Before answering this question we must turn the ambiguous word "remedy" into something more precise. If by "remedy" is meant "cure," then an exceedingly strong position may be taken against the hypothesis and the position is this—that up to the present time experience has not furnished us with a single remedy which can properly be called a "specific cure" for a "specific disease." Now, this is clearly a fundamental and also a staggering fact for those who believe in the doctrine that a remedy for every disease under the sun will be found if only we look carefully enough for it. If the world is not very old, neither is it very young; and if past experience has not furnished us with one single substance which definitely and certainly cures any one certain disease, there is a strong presumption that such substances will be as difficult to find in the future as they have been in the past.—*London Hospital*.

REST AS A MEDICINE.—A physician, writing of rest as a medicine, recommends a short nap in the middle of the day for those who can take it, as a beneficial addition to the night's sleep. It divides the working time, gives the nervous system a fresh hold on life, and enables one to do more than make up for the time so occupied. A caution is given against the indulgence in too long a sleep at such a time, under a penalty of disagreeable relaxation. There has been much discussion regarding the after-dinner nap, many believing it to be injurious, but it is, nevertheless, natural and wholesome.

A CAUSE OF PNEUMONIA.—Dr. F. W. Curtin reports two cases of pneumonia which seem to have a traumatic origin. A boy of eleven was forcibly struck on the left side of the chest with a hatchet. Cough and dyspnea came on in four hours, and the physical signs of pleuropneumonia at the base of both lungs later. The second case was a man of 22 who strained his right side by trying to prevent the fall of a sack of malt. He developed all the signs of pneumonia and died, both lungs being in a state of red hepatization.—*Brit. Med. Jour.*

WILL ALOES CURE HYDROPHOBIA?—It is reported that the American aloes is a very effective remedy. Dr. Patron relates a case of a boy in Peru, who having been badly bitten by a dog, notwithstanding cauterization of the wound, in a few days showed unmistakable signs of having hydrophobia. One day when not

watched he ran into the fields and gathered some leaves of the aloes, which he chewed and swallowed; the symptoms of the disease began to abate and the boy recovered.

USEFUL INFORMATION.

Air-Blasting for Rain.

We have all heard of aerial concussion as a mooted cause of rainfall. Systematic trial of this method is now to be made, by order of Congress, under the auspices of the Department of Agriculture. We read in the *Scientific American* that Senator Farwell of Illinois proposes to devote himself to the scientific work of trying to produce rain by the firing of cartridges of gun-powder or nitro-glycerine high up in the air. During the last session, Congress appropriated \$2000 for carrying on experiments of the kind, but Senator Farwell does not intend to limit himself to this small sum, and will, if necessary, contribute from his own pocket such sum as may be necessary to complete the trial to his satisfaction. The main fact on which the theory of the experiments is based is the circumstance that heavy cannonading is often followed, after a day or two, by rain. Acting on this observation, attempts have been made at intervals, during the last hundred years, to produce rain by firing cannon and producing concussions of the air in other ways, but without much success. Senator Farwell, however, says that during the construction of the Central Pacific railroad through the arid region east of the Rocky mountains, where a great deal of blasting was necessary, it rained every day that there was blasting. For this reason, he thinks that a sharp explosion of nitro-glycerine, produced high up in the air, would be more effective than cannon firing near the ground, and he proposes to send up balloons in the dry portions of Western Kansas and Colorado, furnished with torpedoes and slow matches, by which he hopes to obtain a concussion extending for 50 miles in every direction.

KEM KOM is the outlandish name given to a new chemical compound owned and introduced by the Standard Coal and Fuel Co., Boston, for treating coal and other combustible substances. The effect upon coal treated by this compound is said to increase the heat and the steam, economize time and fuel, consume the smoke and poisonous gases which ordinarily arise from burning coal, destroy the clinkers and soot, and materially reduce the quantity of ashes. It is claimed that by treating coal with kem-kom, from 15 to 30 per cent of the coal is saved, that is, coal thus treated will produce the same result and give more heat and steam than from 20 to 30 per cent more coal not treated. It is further claimed that by using this compound on bituminous coal, from 80 to 90 per cent of the smoke is consumed; all the gases that are so obnoxious and unpleasant are destroyed; thus a saving of coal and time, as well as many other advantages, can always be relied on, which together renders this a most important discovery, and one which looks as though it would revolutionize the big coal bills which are such important factors in the running of factories, electric light and power stations, and similar places; and so it will if it accomplishes half of what is claimed for it—a matter which looks extremely doubtful to one standing at this distance from it.

A SNEAK THIEF is usually regarded as a creature of low and depraved tastes. But there is or was one a few weeks since in Providence, R. I., who seems to have an ambition to reach a high elevation in some way. He climbed by night to the top of the Electric Light Co.'s chimney, 250 feet high, presumably by the lightning rod, and stole the platinum tips from the top of the rod. The theft has entailed considerable expense upon the company as the rod will have to be retipped, and can only be done by building a platform about the top of the chimney. Human audacity could scarcely attain to a greater height, especially by such slender means. The company ought to forgive the theft and appoint him trimmer to their lofty light towers.

USES OF THE RARE METALS.—Some rare metals, possessing special qualities are required for certain work. Thus palladium is used in making some parts of time-pieces, and iridium for the points of gold pens, and the unalloyed has no idea of the value of such products. Vanadium coets, for instance, 123,900f. per kilogramme; zirconium, 79,295f.; and lithium, which is the lightest of metals, 77,090f. per kilogramme. Rhodium, which is extremely hard and brittle, and is only fusible at a very high temperature, fetches 25,330f.; and iridium, the heaviest substance hitherto discovered, coets 12,005f. per kilogramme. It will, therefore, be seen that gold and silver are far from being the most precious metals, as far as their market value is concerned.

ANOTHER ALLEGED WHITE LEAD IMPROVEMENT.—G. G. Coleman, of Chicago, claims to have discovered "a method of manufacturing white lead in such a cheap, quick way that the trust which now controls the production of this staple must go to smash." He has already exhibited to a number of Chicago paint dealers some white lead said to have been made by his process. They declared the article to be of good grade. The process has not been ex-

plained further than it requires only 12 hours as against 60 days by the old method, and that no acids are necessary. The basic material used is pig lead.

PAPER HORSESHOES.—There seems to be a great interest in seeking for the best material out of which to make horseshoes. The latest application is paper, which, it is said, will never become smooth or slippery. The shoe, it is said, is simply glued to the foot by some substance which is not affected by water. The shoe is cut out of a plate of papier mache, made as solid as metal by great hydraulic pressure.

THE WOOD WORKER.

DARKENING OAK.—To render new oak wainscoting and oak furniture dark and give it an antique appearance, we have it from good authority that ammonia is the cleanest, best and cheapest material that can be used. The liquid stains commonly used are apt to raise the grain of the wood, make it rough, and it is with difficulty evenly applied, whereas in the use of ammonia it is simply the fumes that color the wood, and do it so completely that it is difficult to tell whether the wood is really new or old. A correspondent in the *English Mechanic* gives the following process of treatment, which he considers the best, after trying the various other processes used by builders and cabinet-makers to darken woods: "Oak is fumigated by liquid ammonia. The wood should be placed in a dark and airtight room (in a big packing-case, if you like), and half a pint or so of ammonia poured into a soap-plate and placed upon the ground in the center of the compartment. This done, shut the entrance and secure any cracks, if any, by pasted slips of paper. Remember that the ammonia does not touch the oak, but the gas that comes from it acts in a wondrous manner upon the tannic acid in that wood, and browns it so deeply that a shaving or two may actually be taken off without removing the color. The depth of shade will entirely depend upon the quantity of ammonia used and the time the wood is exposed. Try an odd bit first experimentally, and then use your own judgment."

TURNING A BALL.—A mechanic who has tried to duplicate a croquet ball by hand in an ordinary wood-turning lathe has found that the job of turning a sphere was greater than he expected. It can be done by placing a square piece of wood against the face plate of the lathe and holding it by pressure from the tail stock. Turn carefully as near as possible by the eye, then with a leadpencil make a mark around the center of the ball, remove the block from the lathe and turn it about one-fourth way around, replace in the lathe and take off light chips until every part of the pencil mark is removed. This will bring the ball nearly perfect; perhaps making one more change of center will finish the job. The philosophy of this method is that the mark made with the pencil around center of the ball is a perfect circle and upon changing axis of ball and working to this circle the perfect circle becomes a perfect sphere. A little practice will enable a good turner to run off nearly perfect balls with considerable speed.

A NEW AND VALUABLE SHINGLE MACHINE.—The Porter, Gage Co., of Ballard, Washington, if reports are true, have a most valuable machine for cutting shingles. The cedar bolts are steamed five hours, then run through a trimmer, then they go to the cutting knife, which is a heavy knife running at 170 strokes a minute. The shingles are cut off at that rate apparently as easy as a cheese would be cut. The shingles come from it almost too fast to count. They are hot and steaming and cut smooth. They are afterward treated the same as other shingles. It is claimed that the steaming drives out all sap and prevents them from ever warping. The highest cut ever made in a ten hours' run was 96,000. This machine makes no sawdust, hence no waste. The shingles are much smoother than sawed ones, in fact they have the appearance of being planed. There are but four of these machines in operation.

TERRA COTTA LUMBER.—Near Melbourne, Australia, is a factory of terra cotta lumber from clay and hardwood sawdust. In the process of manufacture the sawdust is spread and left lying on the clay in the pit from 36 to 40 days to allow it to sweat. Both are then mixed thoroughly, stones being eliminated, the mass is molded to the desired shapes, steam dried, and the sawdust roasted out in a kiln. The product is guaranteed to be proof against fire, heat, cold and vermin.

OAK FURNITURE.—Furniture manufacturers believe oak will continue to be the popular wood for furniture for some time. Mahogany is, of course, the wood for expensive furniture, but for goods of medium price oak will still be the proper thing. Walnut would have its day again if a supply could be had. Stained woods have had their day.

WELL-SEASONED WOOD.—To test wood whether it is well seasoned, put a small quantity of tincture of iodo on a part freshly sawn or cut. If it assumes a dark, nearly inky, color, then the wood is good and at least one year out; but if the place assumes a yellow color, then the wood is quite new and not fit to use.

ELECTRICITY.

FACTS ABOUT ELECTRICITY.—"All the energy in the world," said Dr. C. F. Coandler, in a recent lecture before the Columbia School of Mines, "come from annuins. Even the energy in the electric battery that rings the doorbells of our homes has its origin in the light of the great solar system. The force in the copper wire that sets the bell to ringing comes from the zinc plate in the battery jar. The energy in the zinc plate comes from the Anthracite coal with which it was burned when taken from the mines, and, finally, the energy in the Anthracite coal was put there by the sunlight that fed and nourished it when it existed, ages ago, as trees and plants. An interesting misapprehension that exists in the minds of a good many persons, is concerning the vital dangers that lurk in the presence of, say, a thousand volts. The newspapers often tell us that a man has been killed by such a pressure, whereas, in fact, such a pressure alone could not kill a humming bird. I have frequently caught in my hand sparks possessing an electro-motive force of 100,000 volts without feeling anything more than a very slight burn. The danger arises only when the volts are reinforced by a good many amperes or currents, as when one takes hold of a charged wire. Then one feels a shock that is unmistakable, because the force of a great many currents in the wire suddenly decomposes all the fluids in his body. The salt in the blood at once turns to chlorine gas, and the man whose veins are charged with this deadly poison cannot in reason be expected to live long."

ELECTRICAL DEVICE FOR LOCOMOTIVES.—An interesting invention is now undergoing thorough investigation, which promises much for the improvement of railway traffic, both in increasing the safety of railroad and the pulling capacity of a locomotive. The invention consists of a small dynamo and an auxiliary engine placed upon the locomotive in such a way as to be easily operated, furnishing a current of small force but large quantity, which is made to pass from one pole of the dynamo to one pair of driving-wheels, thence along the rail to the other pair of driving-wheels, thence to the other pole of the dynamo, thus forming a traveling circuit, moving at all times with the locomotive. By means of this current, an inductive weld is caused between the wheels and rails at the point of contact, preventing the slipping of wheels. The working model of the device shows an increase of 400 per cent in the hauling power of the locomotive. The model without the application of the current would not mount a grade of 15 per cent, but when the current was applied, it mounted a grade of 35 per cent. A locomotive is now being equipped with the invention to test it on the Baltimore & Ohio railway.—*Modern Light and Heat*.

ELECTRICAL TRANSMISSION OF POWER.—In the recent competition instigated by the Cataract Construction Co. for the utilization of the power of Niagara Falls, there were fifteen different schemes presented, of which seven proposed electrical transmission of power, two hydraulic, and six pneumatic. Of the electrical schemes two advocated alternate current transmission at 5,000 and 10,000 volts, and the remaining five continuous-current transmission at potentials varying from 1,600 to 4,500 volts. The fact that the number of electrical schemes proposed was less than the sum of the pneumatic and hydraulic plans, said Mr. Gisbert Kapp, in a recent lecture before the Society of Arts, London, showed that electrical engineers were scarcely prepared to deal with a problem of this magnitude. At present the limits of distance for the electric transmission of power at a reasonable cost are about four to five miles. Beyond the latter distance the economical voltage for 500 horse power is beyond the capacity of one machine. Practically, the extreme limit for direct currents is between 2,000 and 3,000 volts.

THE PROPER DIVISION OF POWER IN SHOPS is attracting more and more attention among mechanical engineers. It is well known that the only time when power is being transmitted economically is when all the machinery is running, for then each has its own share to contribute to the cost of driving the shafting. In many places, there are so many countershafts and idle belts at work that when a small portion of the machinery is being driven, it makes but little difference in the power-bill, and yet we find them running noon hours and night-time to accommodate an outside job, where only a small drill lathe, or something of the kind, is occasionally required. Division of power is as important as division of machinery, and it looks as though electrical driving would solve this problem completely, for we find a small dynamo is kept in many places all ready to be set up behind any machine when a lathe or a planer is to be driven in the night-time.

AN ELECTRIC CLUB.—One of the latest proposed applications of electricity is a policeman's club that contains a galvanic battery. When the rowdy seizes the club, thinking to wrest it from the policeman, the rowdy receives an electric shock, which astonishes and paralyzes him, rendering his capture easy.

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Passing Events.

The city is preparing for an elaborate reception of the Chief Magistrates of the Nation who arrives here on Saturday evening from the South. The city will be illuminated that night, and will be in gala attire for a week to come.

The armored cruiser Monterey, which is to be launched on Tuesday, is the third of the Government vessels built in this city, and there are two more in process of construction. In the future, San Francisco is sure to get her share of work in building the new navy of the United States, having proved her ability in this line.

Quartz mining is alive all over the State, and a prosperous year in this industry is predicted. The blue gravel regions of the northern end of the State are also receiving the attention due them, and very favorable prospects are apparent.

The reports from the Pahump valley, Nevada mines, about which there was some excitement a few weeks since, are not such as to warrant many people going in that direction, as the heat claims are all located.

There is some little excitement in Salt Lake over the prospects of the Deep Creek country, where some very promising mining properties are being opened.

The Seattle Knights of Labor assert that efforts are being made to bring 600 miners from Illinois to take the places of the strikers in the Newcastle and Gilman mines. There are already a number of coal miners idle in Washington.

The Pollok Gold-Extracting Process.

The Grass Valley Gold-Extracting Company is an English corporation with J. W. Higginbottom resident manager, and W. L. Holmes metallurgist in charge. The company's works are located one and one-half miles N. E. of Grass Valley, on the line of the Nevada C. N. G. R. R. The system employed is known as "The Pollok Gold-Extracting Process."

The ore is crushed, passed through a rotary drier, then through rolls, and screened. The coarse particles are returned to the rolls to be recrushed, and when crushed, the ore is discharged into a large storage hopper. From this hopper, charges of from six to eight tons are taken and charged into Bruckner furnaces, and here given an oxidizing roast, or when required, a chloridizing roast, of from six to 12 hours. The roasted ore is then discharged on to an iron cooling floor, and thence to scales.

When weighed, the ore is dumped into revolving chlorinating cylinders, 4500 pounds to a charge. Here bisulphide of soda is added, and water fed into the cylinder through a trunnion, until the cylinder is filled to a stopcock. All air being excluded, pressure is then turned on to the water, through the trunnion pipe, up to 100 pounds to the square inch. The bisulphide of soda is dissolved in the water, and the free sulphuric acid thus liberated, combining with the calcium of the leaching powder, thus sets free the chlorine in the leaching powder. The chlorine gas thus set free is liquefied by the 100 pounds to the inch pressure, in the cylinder, and is forced through, and with the rotary motion, brought in direct contact with every particle of ore in the cylinder. At the expiration of one and one-half to two hours time, the cylinder is stopped rotating, the blow-off valve opened, and the escaping gas and liquor conducted on to the filter beds. These are rectangular, three feet in depth, four in width and ten in length, lined with chemically pure lead and painted with P. P. paint. After the gas has escaped, the manhole of the chlorinating cylinder is opened and the vessel given a half-turn, thus discharging all of the contents of the cylinder on to the filter bed. The filter bed is then connected with a powerful exhaust and force-pump, and the chlorided solution drawn through the ore and filtering medium, and thence pumped into lead-lined and painted settling tanks. Each tank has a settling capacity equal to the chloride liquor from three charges.

The liquor is now allowed 12 hours to settle. Any oxalons matter, such as lead or magnesia, is precipitated by the addition of sulphuric acid. The clear liquor is then drawn off into precipitating tanks. Here the gold held in solution is precipitated by the addition of sulphide of iron. The precipitate is then given 24 hours to settle. Then the liquor is siphoned off into a third tank, where it remains for another 24 hours.

In this tank the gold carried over in suspension from the precipitating tank is allowed to settle, and the final solution passed through a special filter, which recovers all of the gold. This filter is cleaned up semi-annually, while the gold from the precipitating tank is taken up every 15 days. The gold is washed in a dilute solution of sulphuric acid to remove the salts of iron. The resulting product is then dried and fused into bars, the gold obtained being 990 fine.

The works have a capacity of 50 tons a day; the company purchases ore on their assay value or work on a percentage. The Pollok patent is in successful operation in Chili, Australia and Africa.

The Grass Valley plant is the only one in operation in North America. The works of the company are very favorably situated both for receiving and handling the ores to be treated. On the hill above the works, is the mansion of the manager; at the side of the railroad tracks, the company's offices, and immediately opposite the works, which extend down the mountain's side to its base, thus making the works as near automatic as possible, and giving the desired pressure from the water pipe.

The motive power of the works is water. The metallurgist in charge, Mr. W. L. Holmes, is justly proud of the assay office connected with the works. It is doubtful if a more complete assay office is to be found in the State. These works are not only a great factor in the

profitable working of the sulphurets and high-grade ores of Nevada county, but will prove equally valuable to the owners of high-grade and especially rebellious ores from all points, thus not only proving a valuable acquisition to the methods employed in the treatment of the ores of the State, but very materially lessening the cost, as well as increasing the returns.

Nevada Salt.

None of the salt companies of Nevada are at the present time very large producers, with the exception, perhaps, of the Desert Crystal Co. at White Plains. The companies in that State now producing any salt at all make only enough for local use, the ore mills in the region consuming most of it.

The salt supply of Nevada has an interesting history. For several years at first the salt used in the mills running on the Comstock ores was all imported from California, at a cost of \$140 per ton and sometimes more; then the supply was obtained from Rhode's marsh, lying nearly 200 miles to the southeast, whence it was packed in on camels brought into the country for the purpose, much of the road between the marsh and the mines being sandy. Through recourse to this expedient the cost of the article to the millmen was reduced nearly one-half. When, a few years later, the Sand Spring deposit, nearer the mines by 80 miles, was discovered, the price underwent a further reduction. In 1867, the Central Pacific railroad having reached White Plains, the deposit there was utilized, further reducing the price of salt to the Comstock consumers and excluding the Sand Springs product from that market. The extension of the Central Pacific and the building of other railroads in that State has served in other cases to shift active salt production from one locality to another.

Most of the salt consumed in that region being employed for ore reduction, is used as gathered on the marshes, it serving for that purpose better than if refined, owing to the considerable percentage of soda it contains in its natural state.

California at the World's Fair.

There is an unfortunate outcropping of affairs with reference to the representation of our State at the Columbian Exposition. The State Commissioners, find on assembling for conference that their work may be sharply arrested by the attitude which the National Commissioners may take in shaping the rules for the fair. It has been reported by telegraph that some of the National Commissioners, including at least one of California's representatives in that body, will take ground against separate State displays, and order all the articles placed under the headings contemplated by their scheme of classification. This would be a serious disappointment to the people of California who have been moved to generous appropriation for this work wholly upon the idea of having a separate California display, and not only that, but not to do this would render the appropriation of \$300,000 unavailable, for it was not made as a contribution to the World's Columbian Exposition's general fund. If it is not expended as intended by the Legislature, for a special exhibit, it cannot be expended at all, because the Constitution requires that expenditure of State money should be made under State auspices and not otherwise.

The chances are, then, if the National Commissioners insist upon a segregation of California material, that the State Commissioners would resign as having nothing to do, and the \$300,000 would remain in the State Treasury, which may be the best place for it after all. This will certainly be the popular decision on the matter if the National Commissioners do not show more regard for the wishes of the California people than they have hitherto.

THE strike in the Delhi mine, near Columbia Hill, Nevada county, is an important one. The mine has been opened about five years, and has paid \$330,000 in dividends. A great deal of money has been spent in development, one of the tunnels costing \$40,000 for its 1400 feet. The ledge is four feet wide, and it is believed will mill from \$80 to \$90 per ton. It is not specimen rock, but is of high grade.

THE State Mining Bureau Museum has been robbed of a number of rare articles, though none of them were of great intrinsic value.

The President's Visit.

The President has been visiting Los Angeles, Riverside and San Diego. His westward journey has been an ovation throughout. The Presidential party entered the State of California at Fort Yuma at 4:50 o'clock Wednesday and was presented with a large quantity of beautiful flowers and fruits. The entire party was asleep at the time, so did not see the presentation committee. When the Presidential party reached Iodio at 8:15 o'clock, it was received by a large and influential delegation, headed by Governor Markham, who made the following address of welcome:

Mr. President: As the Governor of California, and in her name and on behalf of her people, I greet you on the very threshold of her territory, and bid you a most hearty welcome to our State. This I do on behalf of all her people irrespective of party affiliations, and, sir, as a proof of this, I shall soon take pleasure in introducing to you distinguished representatives of both political parties, who are with me and who heartily join in welcoming you as the Executive of our great nation.

Let me assure you that we fully appreciate the great effort you have been obliged to make in order to visit our coast; but I am confident that you and your party will feel repaid when you see the wonderful features so peculiar to our State, and of which every Californian is so justly proud, and of which so little is known or correctly understood by the people of the great East.

California, Mr. President, is an Empire of itself, 700 miles in length and 300 miles in width, thus affording every gradation of climate and almost every production of any country under the sun.

And, sir, permit me to say that, though we are hundreds of miles from the National Capital, and separated from the people of the East and South by what may seem endless plains and impassable mountains, yet we are in close sympathy with them in all national affairs and are exceedingly proud of the position we occupy in the great sisterhood of States over which you have been called to preside.

You will be convinced of these facts, Mr. President, by the cordiality with which you, as the representative of the whole country, will be received in every portion of the State.

I think it but just to the immediate portion of the State upon which you are entering, to say that almost the whole of the wonderful development which you will witness is the work of the last decade. Ten years ago, with few exceptions, what is termed Southern California was a desert, barren and uninviting, but now a veritable garden, beautiful to behold, and producing millions of dollars annually, hiding fair in time to control the markets of the world with her products. Ten years ago Los Angeles was but a back-country village, with less than 12,000 inhabitants, but now a city with nearly 60,000, with all the modern improvements for the comfort and convenience of man. What is true of her progress is also true of San Diego, San Bernardino and many other places.

Pursuing your journey to the north, you will see the beauties of Santa Barbara, the immensity of the San Joaquin valley—the natural granary of the world, developing like magic into orchards and vineyards, and so on to the magnificent city of San Francisco.

And, Mr. President, when you reach that great city I want you to remember that all the evidences of prosperity you will see, and they are countless, are but evidences of the immense resources of this State; for that city has been created, built and sustained out of the money flowing in from the sale of our own products, which can be said of few cities of importance in the United States.

It has been arranged for you to see the central portion of the State fairly well, and I need not dwell on what is in store for you, as I do not believe such a country exists outside of California.

I regret that your visit is so arranged that you will not see in detail the northern counties, which, I assure you, are of themselves worth a trip across the continent. It is impossible to describe them and I will not attempt it.

In some of these counties lie millions and millions of dollars in gold, awaiting the discovery of a process of development, which will not injure other important interests and for which we must depend upon the General Government. I am confident that did these mines lie in either France, England, Germany or Russia those governments would take immediate steps to work them.

I regret exceedingly that the short time you will stay among us will not permit you to see the natural scenery for which our State is so noted, among which I need only mention the wonderful Yosemite Valley, the great redwood forests of the north and the mighty mountains with their wealth of beauty.

Mr. President, before closing, I want to ask you to take particular notice of our great lack of national public improvements, of our extensive shipping interest, our almost endless coast lines, almost defenseless and absolutely without harbors of refuge except at San Diego and San Francisco, either of which could accommodate the commerce of the world, but located nearly 500 miles apart.

The President in reply said he would not undertake, while almost choked with the dust

of the plains he had just left, to say all that he hoped to say in the way of pleasant greetings to the citizens of California. Some time when he had been refreshed by their olive-oil and their vineyards he would endeavor to express his gratification at being able to visit California. He had long desired to visit California and it was the objective point of this trip. He had seen the Northern Coast and Puget Sound, but had never before been able to see California. He remembered from boyhood the excitement

President Harrison.

President Benjamin Harrison, of whom a good portrait appears upon this page, was born at North Bend, Hamilton county, Ohio, August 20, 1833. His father was John Scott Harrison, who served his district two terms in Congress. His grandfather was that famous leader and general, who, after a life of brilliant and distinguished service in the form and the field, was elected President of the United

States. He commenced the study of law at Cincinnati, Ohio. In 1853 he was married, and in 1854 he established himself at Indianapolis, his present home. On the breaking out of the Rebellion, he left home, a successful practitioner, and all that makes life pleasant, in response to his country's call for her defense. The same diligent application that contributed to his success in peace enabled him to succeed in war, and the proclamation of peace found him wearing the stars of a general. In 1881 he was elected to the

worked now, however, than ever before, and the number is sure to increase as our cities grow. In the line of marble, there are only a few quarries but they are being properly opened and developed and are gradually increasing their output.

The quarry in Inyo county is making shipments steadily and developments are such as to justify belief that railroad communication with it will soon be made, as it seems certain that the present railroad facil-



OUR DISTINGUISHED VISITOR, BENJAMIN HARRISON, PRESIDENT OF THE UNITED STATES.

of the discovery of gold and had always distantly followed California's growth and progress. The acquisition of California was second only to that of Louisiana and the control of the Mississippi river. It secured us this great coast and made impossible the ownership of a foreign power on any of our coast line. It has helped to perfect our magnificent isolation, which is our great protection against foreign aggression. He thanked the Governor and committee for their kindly reception and assured them that if he should have any complaint to make of his treatment in California, it would be because its people had been too hospitable.

States, after the most exciting campaign of 1840. His great grandfather was one of the heroes of the Revolution, Governor of Virginia, and a signer of the Declaration of Independence. One of his ancestors was a general of the Commonwealth of England, before Cromwell's usurpation, and whose unflinching Republicanism cost him his life in the early days of the Restoration. His immediate descendants came to America and founded the family in this country.

Benjamin Harrison received a classical education, and is a graduate of Miami University, Oxford. Immediately after graduation, he

United States Senate, serving out his full term. In 1884 he was prominently canvassed as a Presidential candidate, and in 1888 was nominated and elected President, taking the oath of office March 4, 1889.

California Marble.

The marble industry of this State is one which now shows great promise. The resources in the matter of building stone in California are not equal to those of other localities, though there are many places where quarries might be opened. There are many more being

ities cannot much longer handle the shipments of this one industry.

In Amador county the stockholders of the Carrara marble quarry are now about to decide upon the most feasible route for a road from the quarry, which is on Sutter creek at a point north of Pine grove, to connect with the main road. There are two practicable roads. The *Amador Ledger* says:

The marble of this quarry is looked upon by the experts of the city as by far the best found on the coast. The stock has been snapped up readily. The outlook is favorable for a thriving industry in marble exportation to be opened in this country in a year or two.

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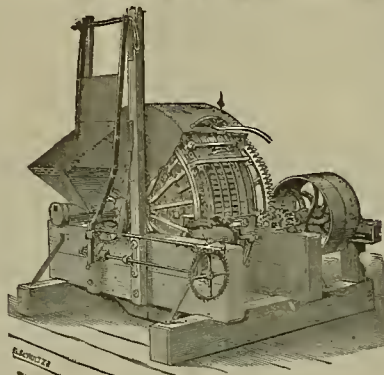
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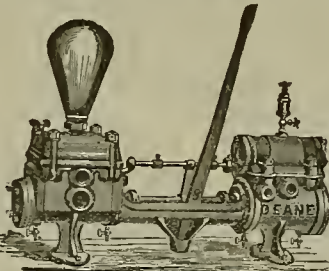
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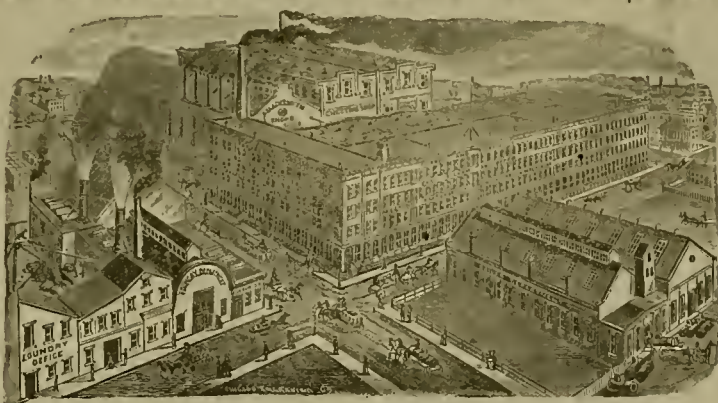
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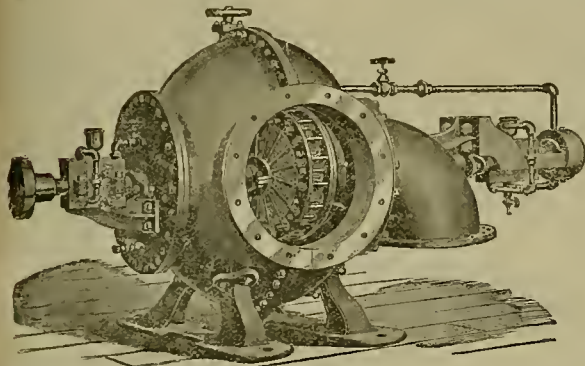
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EDITORS PRESS:—In your issue of the 11th inst. you give me the credit of preparing the plans and specifications submitted by the Pelton Water Wheel Company before the London commission in February last, and on which were awarded the only prize coming to the United States.

I cannot claim the honor you name. My part in the matter was merely advising, and perhaps chiefly in urging the Pelton Water Wheel Company, at the beginning, to compete in this important matter. I saw from the first that the Girard type of turbine would be the only European one successfully presented before the commission, and as the Pelton water wheel occupies here the same relation to general water-wheel practice that the Girard tangential wheels do in Europe, it was the only type of wheel made in this country that could compete under a head of 140 feet.

This conjecture has proved true, and had it not been for the tender of the Pelton Water Wheel Company this country would have been in the humiliating position of having no recognition before the London commission.

The plans and specifications were the work jointly of the staff of the Pelton Water Wheel Company, who designed the wheel and hydraulic apparatus, and Mr. Hans C. Behr of this city, who designed the gearing and apparatus of transmission. My own part consisted mainly in consulting with the president and manager of the company, and in explaining, so far as some knowledge of the matter would permit, what the nature of the competing water wheels would be. Yours respectfully,

JOHN RICHARDS.

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Assessment Notices.

GRAY EAGLE MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Placer County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 24th day of April, 1891, an assessment, No. 23, of Three (3) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 15th day of June, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors
A. W. BARRIOWS, Secretary pro tem.
Office, Room 11, No. 303 California Street, San Francisco, California.

INYO MARBLE COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Inyo County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 30th day of March, 1891, an assessment (No. 12) of Ten Cents per share was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary at the office of the Company, 132 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 12th day of May, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 23rd day of May, 1891, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors
G. W. LUCE, Secretary.
Office, 132 California Street, San Francisco, California.

CARMEL LAND AND COAL COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Monterey County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 11th day of April, 1891, an assessment, No. 3, of Fifty Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary at the office of the Company, Room 9, 324 Pine Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1891, will be delinquent and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 15th day of June, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

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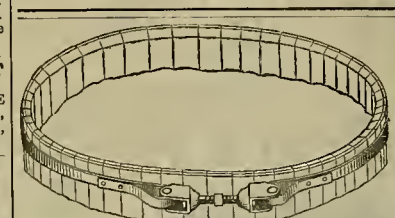
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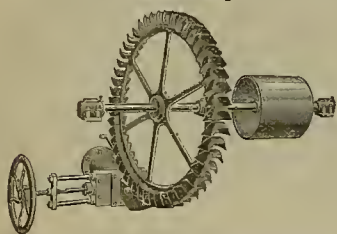
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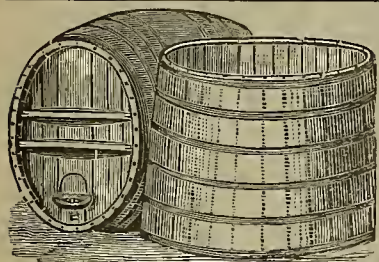
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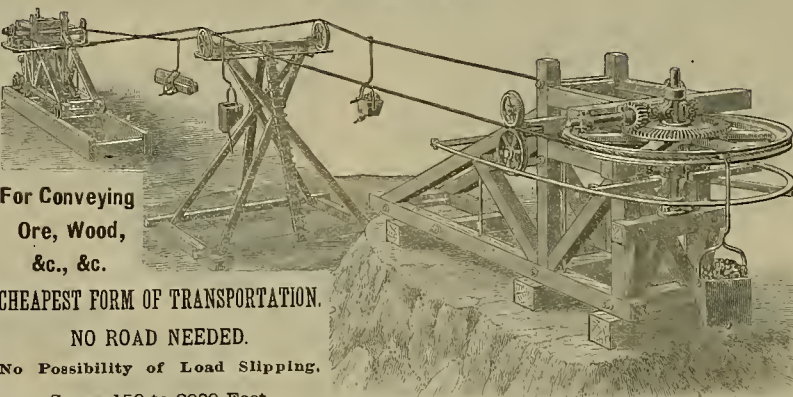
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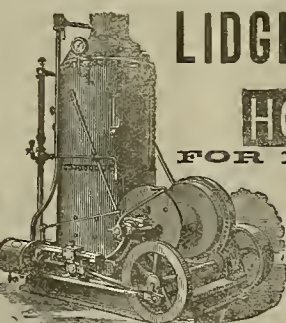
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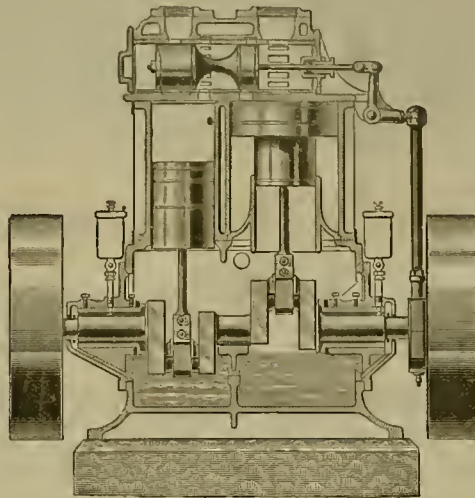
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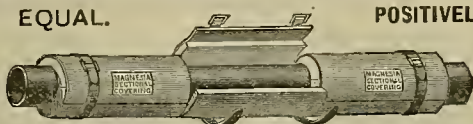
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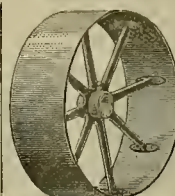
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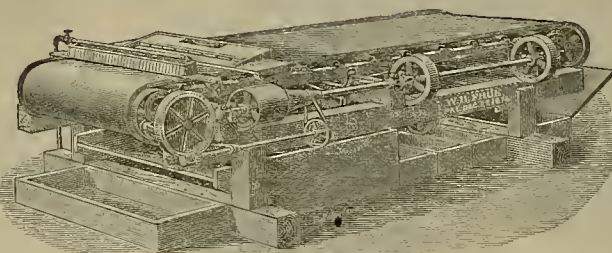
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N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

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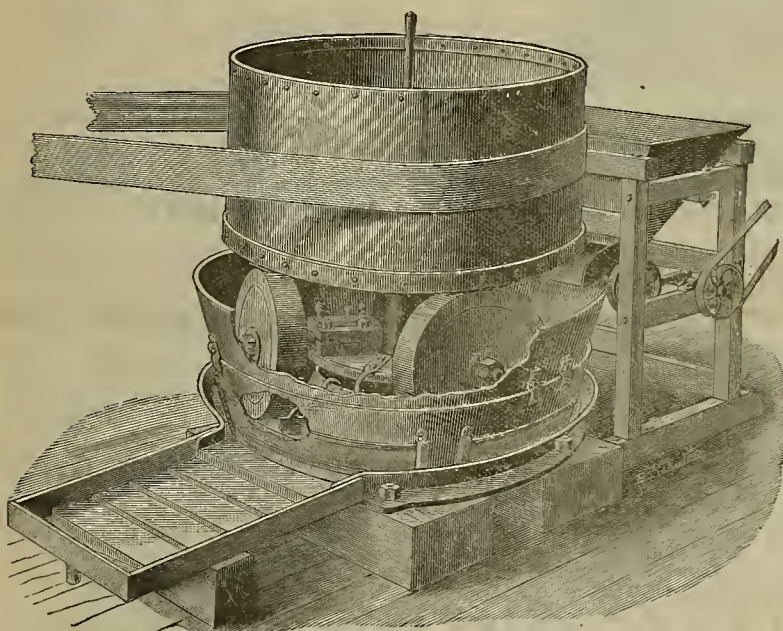
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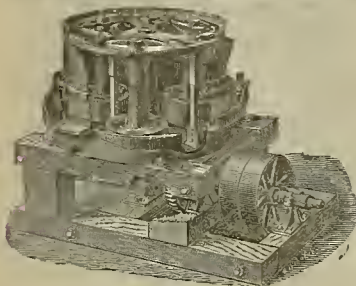
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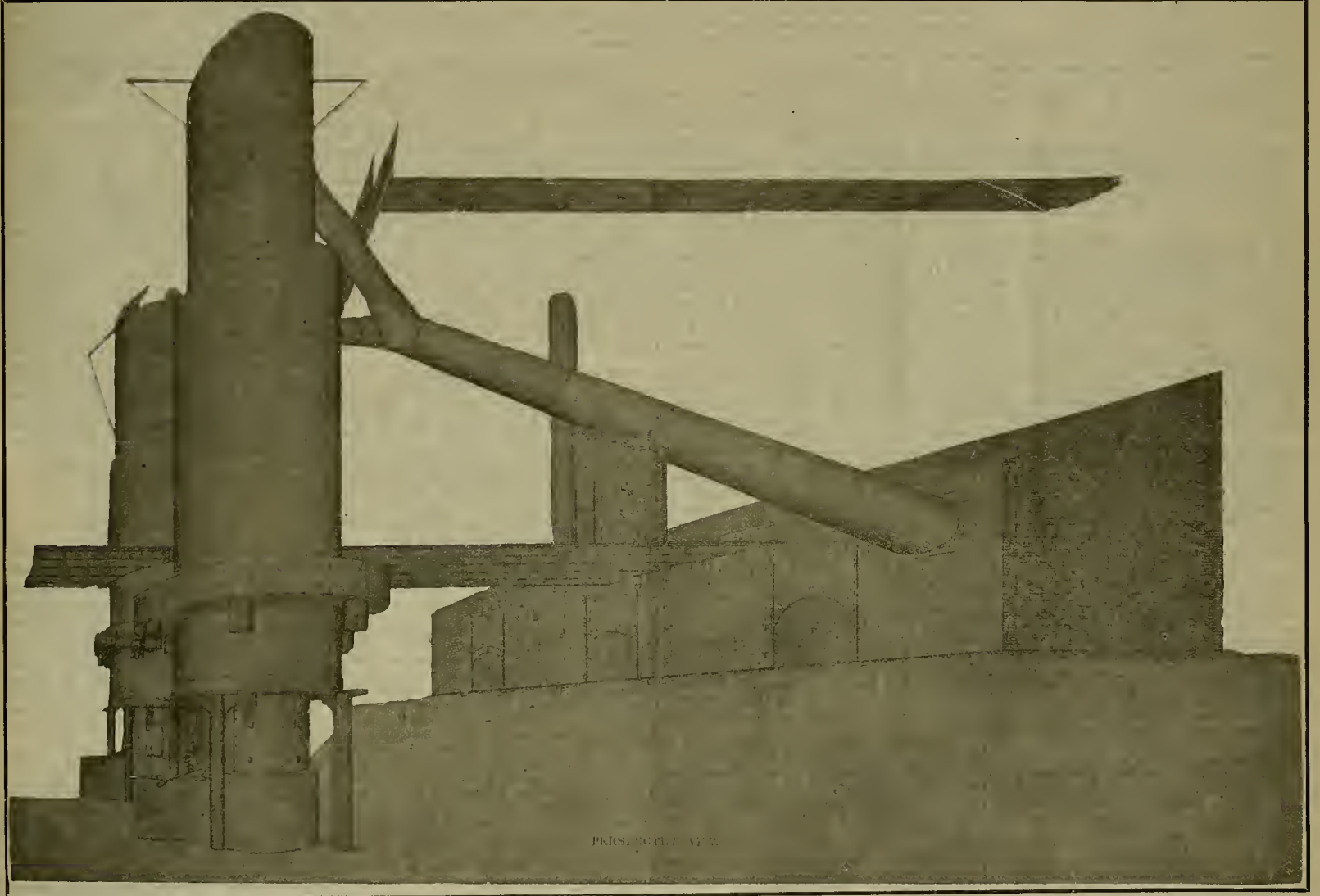
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Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.



PERSPECTIVE VIEW OF LEAD SMELTING FURNACES SHOWING ARRANGEMENT OF FLUES.

The Late Prof. John Le Conte.

Prof. John Le Conte of the University of California died at Berkeley, on Wednesday, aged 73 years. He was only sick a few days, his death resulting from a gripe, complicated with pneumonia. Prof. Le Conte was born in Liberty Co., Ga. After receiving his preparatory classical education at a private school, under the tuition of the Hon. A. H. Stephens, he entered, in 1835, Franklin College, University of Georgia, and was graduated with high honors in August, 1838. He immediately entered the study of medicine, and in 1841 received the degree of M. D. from the College of Physicians and Surgeons, in the city of New York. In August, 1846, he was elected to the chair of Natural Philosophy and Chemistry in Franklin College, his alma mater. This position he resigned in 1855 to become Lecturer on Chemistry in the College of Physicians and Surgeons, in the city of New York. In the spring of 1856, at the conclusion of his course of lectures in New York, he accepted a call to the South Carolina College at Columbia, where he had been unanimously elected to fill the chair, then

first created, of Natural and Mechanical Philosophy. This office he held until 1866, when the South Carolina College was reorganized and transformed into the University of South Carolina. Under the new organization he was unanimously elected to the chair of Natural and Mechanical Philosophy and Astronomy. This position he held until his removal to California. In November, 1868, he was elected to fill the chair of Physics and Industrial Mechanics in the University of California, then in the infancy of its organization. Before the first officer elected by the Board of Regents, he was summoned to California early in 1869 to assist in the organization of the new University. In June, 1869, he was appointed Acting President of the University, drew up its first Prospectus, including a Synopsis of the Course of Instruction, and in September, 1869, initiated the exercises of the University at Oakland, with about 40 students. He continued to act as President until the election of President Durant in August, 1870. After the resignation of President Gillman in March, 1875, he was again appointed Acting President, and on the 1st of June, 1876, was elected full President. He continued in this practice for a year and a

half and then returned to the Chair of Physics.

Prof. Le Conte has published many contributions to medical and physical science. He was a member of the National Academy of Sciences, the American Philosophical Society of Philadelphia and of the California Academy of Sciences. The honorary degree of LL.D. was conferred upon him by the University of Georgia. Prof. Le Conte was one of the most prominent scientists in this country, and a man of high character and ability. He leaves a wife and one son, L. J. Le Conte, a civil engineer, residing in Oakland. His brother, Joseph Le Conte, has been long associated with him as a professor at the University.

Collecting Flue Dust.

We present on this page an engraving of one of the very first smelters started in Leadville, being located on the northern bank of California gulch, and although it may not compare favorably with the later smelting plants, yet it rendered valuable and effective service, not only in the way of profits, but in the development of that wonderful mining district centering at Leadville, Colorado.

As will be seen in the engraving, the flues connect the stack of furnaces with the dust-chambers, they being located immediately outside of the main building, this being the only arrangement of this kind in Leadville. The upper part of the stacks of the furnaces are connected by means of the sheet-iron flues, with a main sheet-iron flue, which enters the brick dust-chambers. Each of the flues is provided with sliding doors, placed on the upper part of the flues and parallel with them; being used for cleaning out the dust which accumulates periodically in the flues. Immediately at the rear of the dust-chamber are long rows of ore bins, and directly back of them is a large roasting-furnace. The level right above and at the rear of the roasting-furnace is the fuel level, which communicates with the blast furnaces by means of an elevated platform, provided with a track of rails. The fuel, charged in light, sheet-iron mining-harrows, is thrown down next to the feed holes along the chutes. This arrangement is capital, and saves much labor; two fuel-men only being needed to supply all the fuel needed in smelting. This is one of the first plants put up in Leadville.

CORRESPONDENCE.

We admit, unendorsed, opinions of correspondents.—Eds.

El Dorado County Mines.

[From Our Traveling Correspondent.]

EDITORS PRESS:—El Dorado is very generally known as the county in which Marshall (at Coloma) first discovered gold. From that date until the present the hills and gulches have continued to send out a large amount of the noble metal. Mining operations at the present time are conducted so quickly that the outside world is deceived into believing that El Dorado is worked out, if not abandoned. This, however, is not the case. While the mines of the county have not attracted the capital needed to develop and equip the well-known quartz mines, still sufficient work is being done at this time to show conclusively that with capital and competent management a vast field for profitable quartz and drift mining can be developed.

Georgetown.

Georgetown has long been famous as a pleasant mountain summer resort, with excellent hotel accommodations. At this time all interest is centered in the new and promising discovery.

The Van Mine.

The Van is situated one mile north of Georgetown, in the center of an old placer mining section, which no doubt received a large share of its gold from this extensive vein. This property is in charge of Mr. P. P. Fischer as superintendent.

The mine consists of two locations each 600x1500, or 600x3000 in all. The owners are sinking a shaft, which is now down 75 feet. From this shaft a drift has been run that shows the vein to be 32 feet in width at this point. A drift has been run into the hill for a distance of 45 feet, showing the vein matter to be of decomposed granular quartz intermixed with talc and porphyry, with slate walls, the present plant consisting of a five-foot Huntington mill with a capacity of 20 tons a day. It is but a prospecting outfit to determine the value and extent of this vein. So far the vein matter has averaged about \$8 to the ton, which is an unusually large showing for a 32-foot vein. Numerous open cuts and shafts on the course of the vein show the pay to be continuous throughout the entire length of the 3000 feet. The owners are very conservative, and until the vein has been given a more thorough test will not consider themselves prospective millionaires.

Garden Valley.

The Taylor mine is situated three miles west of Georgetown, and is on the county road, midway between Garden Valley and Greenwood. This property is in charge of Mr. E. W. Chapman. The mine is opened by a shaft to a depth of 500 feet, with drifts run 450 feet on the vein.

The vein is from six inches to 30 feet in width, and is beyond doubt on the "Mother Lode." At present the work is all of a developing character. The entire output is milled, as the cheapest way to handle it; in consequence this mill value has been low. The mine is equipped with a complete 40-stamp water-power mill, with 40 feet fall for water pressure. Once the mine is thoroughly developed, and all the stamps set to dropping on good ore the Taylor will speak for itself.

Lone Jack.

A. Lawrens is superintendent of the claim. A crosscut has been driven from the 100-foot level, 80 feet to the footwall and a drift run 200 feet, showing seven feet of vein matter, the mill being hung up during the development of mine.

The Ivanhoe.

Is owned by H. W. Russel. This property is opened by a shaft on the hanging-wall to a depth of 200 feet. Had a crosscut to the footwall been run from this depth, the miners would, no doubt, have been rewarded by a vein similar to the Lone Jack. Instead a drift was run into the diorite hanging-wall for a distance of 50 feet, and the work stopped. The shaft was filled with quartz to a depth of 45 feet, when the vein matter left the hanging-wall, crossed over and down on the footwall. The shaft was continued in the gangue of the vein. As the veins of this section are very wide, it is an easy matter to be deceived, and without cross-cutting, believe that the vein has given out. But the mother lode does not give out at 200 feet on the Ivanhoe or any other mine, and this property only wants a crosscut from the bottom of the shaft to the footwall and a drift run on the vein to show it up. I believe it will prove a valuable mine from the fact that all the quartz extracted from this shaft goes over \$8 to the ton. In addition to this shaft other short shafts and crosscuts have been run on the vein all along its course, showing the vein to be strong and well mineralized.

This mine can be purchased for a nominal sum, and is an exceptional chance to get a good mine, with a small amount of additional development.

The Rozsnerans and Esperanza mines are idle at this time; the Rozsnerans awaiting

developments on the Taylor which it adjoins, and the Esperanza a mill to work its large vein.

Kelsey—The Dalmatia Mine.

The American River Syndicate Limited, John Taylor and Sons Managers, London Eng., J. Collen Pearson, resident manager, are operating the Dalmatia mine. W. H. Hubbard is superintendent. The company's mines are located seven miles north of Placerville and one mile east of Kelsey. The mine is opened by a long open cut, out of which the ore is quarried and shot down through chutes into the bins below. From these the ore is taken by car through a tunnel to the mill. The vein matter is somewhat of a conglomerate character on the surface, being composed of quartz and metamorphic slate. In the shaft which is now down 200 feet, the vein is well defined, 20 feet in width, with the quartz carrying a good percentage of galena sulphurets in addition to the free gold; 32,000 tons of ore crushed show an actual cost of 50 cents a ton for mining and milling; a record not equalled. This exceedingly low cost of working is due to the size of the vein, the ease with which it is mined and more particularly to this plant.

The mill has ten stamps and three Huntingtontons with an average crushing capacity of 3500 tons a month. In its motive power this mine enjoys the distinction of being the only mine in the State with

Electric Motive Power.

The mine is not only the pioneer in the use of electric power for mining purposes, but carries its electric power a greater distance than any other mine in America. The company owns the water rights of Rock creek on the American river, where the electric power station is situated. The electric plant at this station consists of one generator of the Brush system of 100-horse-power. The generator is driven by a specially constructed seven-foot Pelton wheel capable of working up to 125-horse power, and using 400 inches of water with 110 feet of pressure. The company has a large excess of power and can operate 1000-horsepower, if desired. The power here generated is carried within a fraction of two miles and to an elevation of 1400 feet by No. 3 insulated wire supported on poles, 100 feet apart.

At the mill the wires connect with a dynamo working up to 60-horse power, which drives the entire plant. In addition to the power furnished the mill, the electric plant also lights the mill and works by a system of seventy 15-candle lights. The Dalmatia uses but one-half of the present available power. To utilize the excess, the syndicate is about opening a mine five miles distant from the power station. At Rock creek this mine will be connected with and operated by the present electric plant. Having proven the electric system a success the company will now increase the power to a sufficient degree to enable it to work all the mines within a radius of 12 miles of the generating plant. This entire plant is connected by a telephone system, thus bringing every part of the property under the immediate control of the superintendent. The electric plant is here a pronounced success, not only does it do all the work required of it, but it almost runs itself. At first it was supposed that an electrician would be required, but at present the management and superintendent find themselves able to operate the entire plant.

This successful application of electricity to mining is not only a honor to Dalmatia, but it opens up an unlimited field of profitable mining in sections where, on account of the inaccessible situation of the mine or the absence of fuel, or water under pressure, it was heretofore impracticable if not impossible to mine to a profit.

Messrs. Jno. Taylor & Son are the largest English mining operators, and with Mr. Pearson as manager it was only a question of can it be done? Once that fact was proven, the electric plant was a foregone conclusion. The company deserves the success that has crowned its efforts, and the writer wishes it a continuation of the same.

Placerville.

At the Pacific, this work is now confined to the drifts from the 1000-foot level, which are steadily being driven ahead. In the meanwhile, the mill is idle. The Gentile Annis is running right along, dropping her ten stamps. The Big Tunnel M. Co. is running its mill on custom rock from the surrounding prospects. The Green Mt. Cement Gravel is running ten stamps. The Chill Ravine mine is now opened by tunnel 1000 feet long, and has a body of cement that goes \$2.50 a ton. The owner, Mr. L. Laudecker, is now putting up a ten-stamp mill. The Llanos M. Co., in Cedar Ravine, have their cement gravel mine opened by a tunnel 4000 feet long, and are running ten stamps. The Rodgers on Smith's Flat is dropping ten stamps on cement gravel that goes from \$3 to \$8 a car.

El Dorado.

The Church G. M. Co., Jas. Richard's superintendent, joins the old Church Union or Springfield mine on the north. At present the shaft is being put down from the 650 to the 750 level. A drift has been run from the 650 level for a distance of 87 feet, which shows a vein that averages 87 feet in width and carries 1½ per cent of sulphurets averaging \$175 to the ton, with the vein averaging \$20 a ton. When the size of the vein (eight feet) is considered, this is an exceptional mine. The large amount of amalgam cleaned up and in sight at the time

of my visit proved the ore's value. The mine is equipped with a ten-stamp mill. Once the Church is thoroughly developed, this mine should keep 30 stamps running, and thus make a record as a gold-producer.

The McNulty.

This property, of which R. S. Raw is superintendent, is now known as the Oakland. It is situated south of the old Church Union. At present drifts are being run to cut the west ledge. This vein has not been worked heretofore. The mine has a ten-stamp mill.

Los Padre.

J. M. Vandersgraff is owner of this mine. It is situated on the North Fork of the Cosumnes river, three miles south of the Church mine. The mine is opened to a depth of 60 feet, showing a 3½-foot vein of \$13 ore, and is equipped with a five-stamp mill. The shaft will be put down 100 feet this season and levels run.

Slate Mines of El Dorado Co.

El Dorado county claims to produce a quality of roofing slate not excelled by that from any other section. This slate deposit is very extensive. Near the Church mine at El Dorado, excellent slates, crops, and as you go north from Placerville to Kelsey, the whole section is slate. The mountain on which the quarries are being worked is known as Slate mountain.

The Jacob Strahle Slate Co.

J. Strahle is superintendent of this quarry, which is near Kelsey. The mine is opened by three faces, and is now taking out 200 to 250 squares a month. The output last year was 1000 squares. Once the mine is opened and benches secured, the output will be increased from 500 to 1000 squares a month. This quarry has furnished slate for the Deaf and Dumb Asylum at Oakland, Concordia Club House Van Ness avenue, S. F., and is now shipping to the Ukiah Insane Asylum and to other places. Mr. Strahle has under construction a narrow-gauge railroad to carry his slate to Chili Bar and thence to Placerville. With water for motive power, this, when completed, will bring all of this freight traffic from Kelsey to Georgetown over this line, and save the climb up the mountain from the American river.

The California Slate Co.

This quarry (E. Bird superintendent) is located on the north side of the American river. The property consists of 640 acres. The slate is opened up by a face 120 feet in width, with three galleries, each of 40 feet. The quarry's output is 200 squares a month. The company now intend to increase their capital stock \$25,000, and with this amount increase their facilities, so that they can keep up with their order. This company has furnished slate for roofing the Stockton Courthouse, State Asylum for the Feeble Minded, Glen Ellen, S. P. R. R. Co., and numerous other parties. In the past year, the company produced slates to the value of \$10,000, and now has orders ahead for a year's output.

Chili Bar Slate Quarry.

Geo. J. Mothershead is superintendent and owner of the Chili Bar quarry, which is situated on the south bank of the American river, three miles north of Placerville. This property consists of 40 acres—all solid slate. The mountain has here an almost perpendicular elevation of 700 feet, affording unusual facilities for rapid and cheap extraction of the slates. The quarry is opened by two galleries of 40 and 60 feet. At present the output is 100 squares a month (ten feet finished on the roof is a square). The slate brings \$7 a square on board cars at Placerville. The Chili has produced \$16,000 worth of slate in the past year, and has now orders ahead for several months. Among its customers are the asylum at Glen Ellen, S. P. R. R.; Lick Baths, S. F.; Deaf and Dumb Asylum, Berkeley; and Napa Asylum. This quarry's slate was awarded the first prize at the Mechanics' Fair in 1890, in competition with all of the slates quarried in the State; also the first premium each year at the El Dorado County Fair. If these slate quarries were located in Pennsylvania, there would be a rush of capitalists to secure them. The supply is practically inexhaustible; the situation such that the slate can be quarried out at a nominal cost for a century to come. What the mines supply is far in arrears of the demand. All that is wanted is the necessary capital to open, equip and extract the slate. Capitalists will find this an unexplored but most profitable field for investment, either to purchase the quarries now being worked or to open and develop new properties. In time El Dorado county's slate mines will crowd her quartz mines for supremacy.

E. H. SCHAEFFLE.

Murphy's, Cal.

Loss of Gold in Milling.

Experience in Colorado.

EDITORS PRESS:—I have read with a great deal of pleasure at different times the able articles by Mr. A. B. Paul, especially in your issues of April 11, the article on "Loss of Gold." We have always looked upon California mining and milling to be away ahead of Colorado, but if such losses exist as Mr. Paul states I think we can beat them. Of course, to amalgamate, we do not use the fast drop stamp, as we found it quite out of the question. As an illustration I will give the work of my own mill which is considered by all to be the neatest, best crushing and best mill in the State, in fact its considered

a model mill, and has been extensively copied after, but I am free to state not with the same results as to work. Perhaps the secret lies with the millman as we find very few who are willing to conform to modern uses. Nineteenth of them still stick to the old first principles. I have a 680 lb stamp that drops 18 inches and 29 drops a minute; each stamp crushes a fraction over a ton to the stamp in 24 hours through a 50 mesh flat punched screen. The rock is above the average in hardness and very heavy in mineral such as pyrites lead and zinc with some copper. Out of four tons of ore we get one ton of concentrates. The ore is broken and fed by hand, feeding very low in the dies. Silver plated coppers are used in battery and outside thence to blankets and from there to one of the best little machines ever built called the Gilpin county bump-tables which is about six feet long and three wide. This easily handles five tons every 24 hours and on exhaustive tests of all kinds of ore beats them. The price of this table is but \$100. It is simple and easy to handle and when once adjusted requires but very little attention. Frequent samples are taken from the tail of this table every hour and allowed to settle; then dried and assayed. Such small loss is shown that blankets, after these tables, were found to be of no use. We have had frequent tests of ore taken to our sampling works, crushed, sampled and assayed, and then brought to my mill which showed a saving of 85 to 90 per cent of assay value. Also the getting rid of 700 lbs of zinc in one lot which is a detriment to the concentrates for smelters.

This I know Mr. Paul will admit is a very close saving. After 20 odd years at the business I have come to this conclusion; a certain percentage must go to waste. We rich nature, she is but taking back a little; to reduce it down, get a mine with favorable ore. I am free to say, I am not particularly stoked on the noisy stamps and the constant splash, and realize that nothing can beat the old time arrastras. The Risdon Iron Works of your city are building my ideal of a mill or what I should call an improved arrastra in the Bryan Mill. It would be a great hit if your State geologist would take this matter up and devote part of his most excellent annual report to the different milling plants, and give us figures upon these different kinds of mills. A full discussion by millman on this most important of subjects, cannot but prove a great boon to this great and growing industry. When you get about 85 per cent on assay value in milling, the proof has got to be as awful strong for one to swallow it. What does Mr. Paul think?

PHILIP MIXSELL.

Idaho Springs, Colo.

The Mining Business.

D. W. C. Morgan, who has for many years been connected with mining, remarked yesterday that a few observations on the subject might very appropriately come under the head of "Chat on 'Changes.'" "Unless," continued Mr. Morgan, "it is no longer considered a business in California, and one would very often think so from the difficulty experienced in raising the necessary capital. It was not always so, and it is not likely to be so in the future. The gold deposits of the State are of too much importance to this world at large to remain uncovered."

"In the eternal strife designated as 'business,' the man who makes profits without making them out of their fellow-men are the real producers. The miner who digs a ton of silver or gold-bearing ore adds its value to the wealth of the world without taking anything from any one. He opposes no man, feels no heart burnings from the opposition of any other person because no opposition reduces his profits, or interferes with his business, and for the reason that in all these respects he is a public benefactor, he should have the goodwill of all. His success means benefit to every human being in the land. His is a business which gives full scope and chance for the development of all good and generous impulses, unchanged by the forces of every jealousy and strife, culminating in an everlasting attempt to get the better of 'this other fellow,' and it makes the miner the whole-souled, generous man that he is."

"The mining interests of California have been sadly neglected during recent years. Stock speculation in the Nevada silver mines and wild cat propositions all over the country have had an unhealthy effect in poisoning the public mind against legitimate business. The very mention of a mine is obnoxious to a man who has dropped money in some venture, where all the salvaging done was in the pockets of stock holders through a stock exchange. These people know nothing about real mining, and they do not care, as a rule, to have it explained to them. This explains the reason why English companies like the Sierra Buttes, and others have been able to take their millions out of the country. They had the grit to invest in a mine which repaid them handsomely."

"The same might be said of the neighboring States and Territories. Our people had the first offer of everything valuable there, but it was quietly passed into the hands of Eastern men, who are now reaping all the benefits. When the same people begin to fully understand the profits which accrue from gold quartz mining in California, history will probably repeat itself, and mines which should be held here will be controlled in Chicago, Boston and St. Louis.—S. F. Post."

Blue Gravel in Siskiyou.

Mr. C. B. Jilson writes as follows to the Yreka Journal:

There has been a great deal said about blue gravel. I have probably said less and done more toward developing the blue lead in Siskiyou county than any other one man. I have traced this dead river channel from Butte county to and beyond the Oregon line. There is, however, much country between here and Butte which I have not traversed, and there may be places with equally as good facilities for working as we have here, but I know of none. Pressure, grade and dump are unobscured, with the Klamath river to furnish unlimited power for electric motors, lights, etc., while accessibility could hardly be improved upon, situated, as we are, only two and one-half miles from the railroad depot, with a good county road passing over the mine and directly in front of our door. Perhaps a synopsis of what I have been doing shows my advent into Siskiyou county might prove interesting to your readers. In June, 1887, I came to Henley and located, to my entire satisfaction, two miles of the Blue Gravel mine, before striking a pick into the ground. That summer we ran 370 feet of tunnel, and found the bed-rock pitching, but were rewarded by finding ground that paid, for the last day's work done in the drift, \$30 to the pick. In December, I moved my family here. We then went 1000 feet nearer the river and ran in 190 feet, and, in this drift, found gravel that will pay from five cents to \$3 to the pan. One of the most serious obstacles to overcome was to obtain water. W. H. Smith owned and controlled all of the water in this section, and his property being bonded barred all negotiations until after the expiration of his bond in November, 1888, when we purchased one of his rights for the sum of \$6000. We then had nearly seven miles of ditch and flume to build, which carried us into the spring so late, and being an exceedingly dry year, were unable to do anything but a little prospecting, so that last season was the first opportunity we had of making a showing, and that was mostly consumed in opening the mine, leaving us scant two months to work ground from which we could expect any pay. But few of the citizens of Henley and vicinity had any faith in the enterprise, some of them telling me there was nothing here, that it had been thoroughly prospected 30 years ago; while others went so far as to say that Jilson was an impostor, working a scheme upon the credulity of his friends to obtain money. He, however, kept on the even tenor of his way, his son, son-in-law and self owning and paying three-fourths of the total expenses.

It was only a repetition of history. A new departure for the time being creates antagonism in any community. They are now all enthusiastic over the good find, and gladly acknowledge their belief in the blue lead, and that it is destined to add immense wealth to Northern California. I notice that some correspondents claim that it is impossible to tell the extent or width of the channel east, as at no place is the rim to be seen. From past experience of ancient channels, it is not presumable that the pay will exceed 400 feet in width. As to the east rim, it is just as plainly to be seen at the south end of the Blue Gravel mine as is the west rim, and from rim to rim the distance is about 1200 feet, the sand rock sitting directly down upon the east rim. At no place in this section, north or south of the Klamath river, does the east rim show, from the fact that it is capped with overlying sandstone, the same as the channels in Sierra, Plumas and Nevada are with lava. The Black Jack Company are working very hard cemented gravel, a secondary or later deposit than that of the Blue Gravel Company, from the fact that it has corroded and been carried away from the Klamath river to the Rocky Gulch. If they would not go down, they would find the gravel free and bedrock soft, the same as the Blue Gravel Co. has. The latter company has been doing fair work since the first of March with a light head of water, at no time exceeding 400 inches in their ditch, but reserving enables them to pipe nearly one-half of the time. They are running their main tunnel night and day and expect to be into pay about the first of May, and within six months will probably employ 75 or 100 men, to add on thereafter as room is opened. The cold weather is favorable to the miners, but at heat the season must be short. The El Dorado and Ashland Company hored to bedrock, at a distance of 160 feet last fall, with satisfactory results. A Portland company is at present sinking a shaft north of the Black Jack Company. Owing to facilities for working, I consider that B. Hickox of Oakland and Capt. Welbourne of this place have the second best location in this section. There are locations on all sides of us, north, south, east and west, and however much we may wish it, it would be a miracle for them all to make a strike. Those who have locations upon the channel have mines to develop. Those with locations off the channel have mines—to find.

"THE SHEFFIELD OF SWEDEN."—The Swedes have become very skillful in the manufacture of cutlery. The town of Eskilstuna, lying not far from the western end of Mälar Lake, is now widely known—and deservedly so—as "the Sheffield of Sweden." Here are situated a dozen or more factories, which turn out the

finest cutlery and tools. Eskilstuna razors, pen-knives and scissors are well known and highly prized in almost every country of the globe.

Our Bargain with the Inventor.

A United States patent is a contract. The parties to it are the inventor on the one hand and the people of the United States on the other. The inventor, by a public record, informs the people concerning a useful discovery which he has made, which must be original with him and new in the United States. In return, the people, by their letters patent, secure to him the exclusive right to make, to use and to sell his invention for a limited number of years. At the end of that period the contract terminates, and the discovery belongs to all the people forever. A patent, therefore, does not flow from the bounty of the community as a pension, or a subsidy or a medal. It belongs to the inventor by right. It comes into existence in consequence of the legal establishment of a certain state of facts, namely, that the invention is new, useful and original with the claimant. This disclosure is the consideration on the part of the inventor, who, therefore, gives the community something of value which it did not before possess. The community gives to the inventor, not something of value which it already had, as where a part of the public domain is patented to a settler, but simply protection. If the invention is valuable, so is the protection; if the invention is worthless, the protection is without benefit. Thus the contract is reciprocal and evenly balanced. The validity of a patent depends upon the maintenance of the facts established. To determine issues of validity is a function of the United States courts; to determine whether the consideration probably exists, and to make the contract itself, is the function of the United States Patent Office. "He who receives an idea from me," wrote Thomas Jefferson, "receives instruction himself without lessening mine; as he who lights his taper at mine receives light without darkening mine." An idea once made known is subject to human control only when incorporated, and therefore it can become the subject of patent only when it is tangible and existent. In the beginning it may be regarded as a marvel; in time it becomes a necessity of life, a manufacture, perhaps the basis of a great industry. In a certain sense the invention then detaches itself from the inventor, for the patent no longer protects only one man, but through him many men in their rights.

The patent system of the United States has now completed its one hundredth year. The experience of the century shows that the advantages incident to the patent contract constitute a sufficient incentive, not merely to lead people to publish their inventions, but to make them invent. The number of patents granted yearly has steadily augmented; it is now more than 25,000 and is increasing. Under the fostering protection of patents we have developed, and are developing inventors as a distinctive national product; and because of this we are enabled to exhibit to the world a growth and prosperity as a manufacturing people unexampled in the history of mankind. The patent contract secures to the inventor his right for a fixed period of time, absolutely and without limitation, save by the obligations which every man owes to society. It assumes that self-interest will best conduce to the development of the invention, and therefore, it imposes on the patentee no recurring taxes, nor does it compel him practically to operate his device. A patent grant is not made in payment for an invention, in the sense that one is a measure of value for the other, but in return for its disclosure. No one can assess the value of a new discovery to the human race for all time. The more important it is, however, the more income must become the returns obtainable during the latent period. The millions made from the patents on the sewing machine, or the reaper and mower, or the telegraph, or the telephone, are utterly inconsiderable beside the enormous benefits which the public acquires through all industry from these inventions. Whether the thing contrived is to underlie a great industry or whether it is merely an improved pin, the inventor, to be entitled to his patent, must disclose it fully, and without restriction or reservation; so that when the patent term shall be finished, the public may be able to make and use the thing as well as he himself can make and use it. He is entitled in return to equally full, unreserved and unrestricted protection. To lessen the enjoyment of that protection, or to limit it by harassing requirements, such as taxes or obligations to work the invention, as the opponents of the system have proposed, would amount simply to failure on the part of the people to comply with their side of the contract.—Park Benjamin in the Forum.

AGE OF THE OAK.—The heart of the oak begins to rot at about the age of 300 years. The holly oak alone escapes this law. It is said, and there is a specimen of this age 410 years in existence near Aschaffenburg, in Germany.

WOOD AND IRON WORKING MACHINERY. Statistics show that the average duration of wood-working factories is eight years and of machine-shops about twenty.

EVICCTIONS of striking miners in the Pennsylvania coke regions continue.

Asphalt in Kern County.

Mr. Louis Blankenhorn gives the Los Angeles Herald the following account of the asphalt fields of Kern county:

The mines occur in two fields, south and west of Bakersfield, one lying in the foothills on the north side of the Tehachas, and the other on the eastern slope of the Coast Range. They have been practically unknown for many years, no State mineralogist or geologist, except perhaps Hanks, having mentioned them. Their value, however, was foreseen, and the locations covering the asphalt and oil, they being together, were most of them patented years ago, among others by Solomon Jewett, the millionaire banker, rancher and sheep-raiser, who located a claim in 1861—30 years ago. The Bona Vista Oil Company spent \$25,000 in development, and the Union Oil Company, composed of Georgians, a large sum also; but lack of transportation, or high rates and prices, made it unprofitable in those times. Since then the investigation of asphalt and its application to paving, roofing, varnish and other uses have brought it into use in the United States to the extent of 70,000 tons annually, with an increase of 50 per cent last year, practically all of which has heretofore been imported. Its obsolescence has been for paving, over 400 miles of it now being laid in a score of cities, including New York, Brooklyn, Philadelphia, Washington, Buffalo, Cincinnati, Detroit, Omaha and St. Louis, on a large scale. It is looked upon as the most desirable pavement from the standpoint of durability, cleanliness, noiselessness and economy ever used by cities, and the demand for it in the immediate future is likely to take the world's sources of supply.

California is the only State in the Union today which gives promise of any ability to fill any portion of the demand. Although asphalt has been found in Utah, Wyoming, Kentucky, and other localities, its development has been hampered by problems of distance, transportation, etc. It is found in various counties of the State, from Monterey south along the Coast Range mountains to Los Angeles, but I believe it is reserved for the Kern county fields to show a future production of millions of tons, and a supply second only to the pitch lake of Trinidad.

The two fields mentioned are each about five miles long, and the black surface indications, outcrop and springs in many places still alive are visible for miles when approaching them. The Standard Asphalt company, of Bakersfield, Cal., now controls these asphalt mines, and for several months past have been engaged in refining and shipping it. Some of the men constituting the company, bringing to it the capital and experience necessary to push it, are Solomon Jewett and H. A. Blodgett, of Bakersfield, Henry Williams of San Francisco, E. G. Church, for many years manager and superintendent of the Barber Asphalt company at Buffalo and Kansas City, S. Hinton and myself of this city. Mr. Church, who is an expert and authority on asphalt, and familiar with the Trinidad and others, pronounces the Standard, of Kern county, equal to any produced, if not superior, for paving and kindred purposes. The companies have now a force of men and 20 kettles in operation refining the asphalt, which refining capacity will be largely increased by plants now being constructed.

In close proximity to the asphalt fields, and a part of them, are wells, springs and tunnels producing a very heavy petroleum oil, whose base or residuum, being asphaltum, is a very valuable aid and adjunct in the fluxing and refining of the hard and rocky asphalt. This quality in this oil has given great value to a formerly almost useless form of petroleum, and is causing it to supersede for this purpose the coal-tar and residuum in universal use in the East, produced from the Eastern oils having only paraffine and no asphaltum base.

The asphalt occurs in layers and masses, at present of unexplored thickness, easily taken out with the pick and wedge. The liquid asphalt or flux is added in certain proportions, and melting proceeds until the dross or sand has settled and the pure and refined liquid can be drawn off into boxes and barrels ready for shipment. A higher degree of refining is required for the roofing compound. This compound has a flexibility at all temperatures very superior to ordinary asphalt, whose nature when purest renders it very brittle when cold and runs when warm. It is a singular fact that in California, where the asphalt has always been obtainable to some extent, roofs of asphalt and gravel or felt covering are scarcely known, while in the Eastern States, a land of very cold and hot extremes, there are veritable square miles of roof, covered with coal-tar and gravel compounds called asphalt, but concededly inferior. California should supply a great many tons of asphalt for roofing in the future. The asphalt beds of California and their products will be a mine of wealth to Kern county, and incidentally to California.

It is now extensively used in Southern California in paving for sidewalks and floors, also for the lining of reservoirs and flumes. The Los Posas Land Company and Santa Ana Water Company of Ventura county, E. L. Barber of San Fernando, J. I. Case & Studebaker of Monrovia, the Victoria Mining Company of Azusa, the Bear Valley Irrigation Company, J. D. Sobnyler, former State Engineer, and others, are cases where asphalt has been used for reservoir or flume work with most satisfactory results. This use alone means ultimately the supplanting of imported

cement and the keeping at home many hundreds of thousands of dollars now sent abroad, aside from the possible construction, cheaply, of reservoirs in situations not possible with or without cement.

Kern county has vast mineral resources aside from its wonderful asphalt. I saw on the same quarter-section with the asphalt beds, oil springs and oil-producing wells, a tract measuring many acres, seemingly, a crust of sulphur in several places developed thus far four to six feet deep, by analysis 80 per cent pure; kaolin strata two feet thick, white, soft and fireless, producing, it is stated, by analysis, 35 per cent of aluminum; and in the same strata crystals of alum seemingly pure when tasted. In the mountains near by are known to be silver, antimony, tin and iron, while gypsum is widespread in its showings. Mr. Blankenhorn brought home specimens of many of these articles.

Prospecting a Mine.

The Virginia Enterprise says:—The statement that the Comstock lode has been pretty well prospected below the water level to the depth of over 3000 feet has often been published by journals in the East that devote some attention to mining and it is generally believed by the readers. The statement is absolutely false and works great injury to our industry.

In the Gold Hill mines a long drift was sent out on the 2700 level of Crown Point, which struck an immense flow of water that came from the Eschequer ground. It also struck a rich body of quartz which the mine management would have given a great deal of money to have been permitted to prospect, but the water drowned them out. When the water was struck, prospecting drifts had entered another promising body of ore on the 2700 level of Belcher. They were driven from that, and it remains unprospected. On the 1900 level of Crown Point, and also on the 2200 level, there are two bodies of ore known to exist, where the miners were driven by the flood, but the Gold Hill pumping operations will soon regain possession of the country to that depth.

As depth was attained during deep mining on the lode, long drifts were speedily shot out from the sinking shaft stations, but no time was allowed for proper prospecting work, such as any recently informed miner would call prospecting a mine—such work as is now being done in the upper levels.

Time and again leading Comstock mines have been on the point of being abandoned, when luckily some prospecting work being done immediately between formerly explored levels would strike ore from which millions of money were subsequently taken out. Con. Cal. & Va. sold in the open Board for 25 cents a share—and operators shorted it at that—and in an incredible short time the same shares sold at \$65 a share, and \$3,466,700 have been paid in dividends since, and at least \$17,000,000 have been taken out from what was then called a prospected mine.

James G. Fair said he had prospected Hale & Norcross, and "swept this waste with a broom." Within exactly five feet of one of Fair's prospecting upraises Superintendent Keating struck a body of ore from which about \$5,000,000 have been extracted.

Within the past few weeks in the Savage a body of rich ore was struck within a foot of an old prospecting shaft.

Still, alleged mining writers say that the Comstock lode has been pretty well prospected below the water level.

What is understood as prospecting a mine nowadays is to cut it up into 50 foot cubes by lateral drifts, crosscuts, raises and winzes, and no good miner will consider that it has been prospected until this has been done.

American Tin.

When the train bearing the Presidential party arrived at South Riverside, a novel sight was seen. Manager Robinson of the San Jacinto estate had erected on a raised platform a pyramid of tin, 15 feet high, containing 100 ingots of 64 pounds each, of pure metallic tin. The pyramid was surrounded with specimens of the ore, and bore the inscription, "The First American Tin, April 23, 1891." The stars and stripes and the company's private flag floated from the top of the glittering mass of metal.

As the train came to a standstill, the President and several of his party stepped out on the car platform to witness the novel exhibit and were welcomed by Colonel Robinson, who explained that what they saw was the first successful attempt ever made in America to produce tin from its ores in a large way, and that the mines under his charge gave every assurance of a continuation of the product. He thought that with the assistance of the McKinley tariff, in all reasonable probability, American tin mines could produce enough of the metal for the consumption of the United States, and also successfully compete with Great Britain in the manufacture of tin plate.

The president spoke briefly in reply to Manager Robinson's address, wishing success and prosperity to the enterprise in which he was engaged. Afterward President Harrison and several of his party descended from the car, and, standing at the base of the pyramid, were photographed. Each of the party was then presented with specimens of the tin and ore, after which the special train moved on amid the cheers of those assembled.—Call.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—*Cor. Amador Ledger*, April 25: Operations at the North Star still continue. They are drifting in a northerly direction, and will go a considerable distance yet before they will be satisfied. There is no doubt that before the property will be abandoned, another 200 feet will be sunk, and considerable drifting done at that level. Important changes in the way of improvements are to be made in the South Spring Hill mine, between here and Amador City, in a short time. The hoisting power is to be changed from steam to water. Knight & Co. are getting out two 8-foot water-wheels to operate as a reversible power for hoisting and lowering. The steam hoist will be allowed to remain, so as to be ready for use in case of a break in the ditch or other failure of the water supply. The principal object in this change is economy. The timber is getting scarce, and wood has to be hauled from a distance, and as a result has a steady upward tendency in price. D. T. Davies, while here, ordered at Knight's foundry three 3-foot water-wheels for the Carbonado coal mines, Washington. They are to be used on the condensers in furnishing air underground. The wheels will be ready for shipment in a few days.

PLYMOUTH.—*Cor. Ledger*, April 25: The New London Co. has let off about one-half of its force of miners, so it is running the mine with about 10 or 12 men just a good prospecting outfit. The Plymouth Consolidated mines are working as usual. The mill is still running 40 stamps. Lamb and Hanna, owners of the Good Hope mine, are putting up steam hoisting works, and are going to sink 300 or 400 feet deeper, and if the vein continues good there will be a 40-stamp mill erected on the claim. The Reeves mine is idle on account of putting in some new machinery, which will not take long, when the mine will be worked for all that it is worth.

FROM PINOEER CREEK.—*Cor. Dispatch*, April 18: Pioneer and vicinity is still in a flourishing condition. There is more ore out and in sight than there has been in the last 15 years at any one time. The energy and enterprise displayed here through the last few months is almost certain to develop mines that will last for years and pour out a constant stream of the most precious metal known to commerce. On the Mokelumne river side of the ridge is situated the Strinman mine. This mine has out 700 tons of \$40 ore; the ledge, three feet wide, has a shaft sunk down 60 feet deep to water, and levels run at water level. The ledge is one mass of sulphurets which assays over \$600 per ton. At present they are milling their ore at a mill near the mine which is owned by Mr. James of Pine Grove. A short distance from here is situated the Old Bowers mine which has been reopened by Steve Werly and has every indication of contributing to its lucky owner ten fold more than his fondest expectations. About two miles south of this is the consolidated Sittling Bull. This is an east and west ledge and is owned by Lee Jones and Len Harmon. The ledge is four feet wide and prospects for about \$12 per ton and is traceable for 800 feet on the surface. There is about 75 tons of ore on the dump. West of this mine is the North Star. Their tunnel taps the ledge some 90 feet deep, and the owners, Mr. Boomershine and Strinman, are well satisfied with their prospect. The next mine below this is owned by Mr. Pine and others. This is also worked through a tunnel about 700 feet in length. At present they are sinking a shaft about midway of the tunnel. The ore in the shaft is high grade, heavily sulphureted with considerable free gold. There is about 60 tons of ore on the dump. Next comes the Marchand mine. This is also worked through a tunnel. The ledge is about two feet wide and heavily sulphureted. Mr. Marchand has been a long time getting to this ledge as the rock was extremely hard, but now he feels confident that he will be reimbursed for all his labor and outlay. High up the mountain from here is the Klamman mine. There is about 15 tons of ore on the dump with room for more. Mr. K. works alone, consequently he does not make very rapid headway, yet he has a very good prospect. From here we were soon on the ridge again where we met Mr. Harker who informed us that his youngest son had unearthed a ledge a short distance back of his dwelling house. It is about a foot wide and prospects about \$60 per ton. Mr. Kimball is still working on his mine. He has out about ten tons of ore. The mineral rod is still pulling toward the Arctics. We called at this mine but did not see any one as they all appeared to be working underground. The Griesbach Yelmini has developed into a 15-foot ledge of low-grade ore, and they have started their mill running with five stamps on their own and five on the Bowman ore. A few days ago the Gracy mine struck some extremely rich rock, but as they pushed the level ahead the ledge cooled down to its regular business.

BELL WETHER.—*Amador Ledger*, April 25: Sinking the shaft in this claim in Bright's field has progressed to the depth of 90 feet. The shaft was started on the incline of the ledge; latterly the ledge was found to turn, but the shaft was continued on the same uniform angle. It is not in ledge matter at present, although occasionally they break into quartz, which prospects well. The formation is much better for sinking than the hard quartz. Progress, however, is slow, on account of the quantity of water to be handled. Three shifts are employed, eight hours each. It is intended to go 200 feet, and explore the vein at that depth.

HARDENBURG.—The 20-stamp mill is about completed. Mr. Woodbury, the inventor of the concentrator which bears his name, came up this week to personally attend to the fixing of the two concentrators of his make to be put in this mill. It is claimed that one concentrator will be able to handle the discharge from a five stamp battery. Two Frues are required for each battery where heavy stamps are used. As the stamps of the Hardenburg are light—600 lbs—it is possible that one concentrator will do the work. The pipe is being laid from the mill to the ditch, and next week we hope to report the mill in active operation. Some 400 or 500 tons of ore lie on the dump ready for crushing.

BELMONT.—The superintendent, under date April 23, reports:—The surface tunnel is now in 265 feet, the last 100 feet being driven all in ore,

The mill is kept constantly running; the plates, both inside and out of the batteries, are yielding well.

Calaveras.

RESUMING WORK.—*Chronicle*, April 25: The Quaker City quartz mine, near the Junction, which had suspended operations for a while past, has resumed work. The water has been taken out of the shaft and the shaft repaired, and a contract has now been let, we understand, to sink 100 feet. The present depth of the shaft is 400 feet. The mine is located on the line of the mother lode. With good management, perseverance, and a fair outlay, success may be reasonably expected. The mine is under the superintendence of that efficient veteran miner, Tom Goodwin.

MINING ENTERPRISE.—*Calaveras Prospect*, April 25: The work on the mine on the San Andreas channel at the Swenson place is being pushed rapidly forward. Two steam pumps of the most improved pattern are at Valley Springs, and will be on the ground in a few days. A large force of men has been at work this week getting things ready for the machinery. A dam has been put across the creek between Mrs. Hopkins and Wylie's houses to turn the water into the old ditch, and teams have been hauling pipe and lumber on the ground.

THE PIONEER MINE AT ANGELS.—Conly and Hallock, started up Monday with work on the shaft. This bids fair to be a large addition to Angels' already large mining interest. The mine is on the Mother Lode, and is known to be good property. A 20-stamp mill is to be erected at once, and work will be pushed vigorously.

UTICA.—*Mountain Echo*, April 25: Improvements are going on constantly at the Utica mine. A large building is being erected on the north end of the blacksmith shop, which when completed, will be used as a machine shop.

El Dorado.

ST. LAWRENCE.—*Mt. Democrat*, April 25: It is generally understood that Superintendent Pierson, of the Delmatia mine, has secured the old St. Lawrence property, beyond Kelsey, and on the first of the month steps will be taken to again open up this property. The old St. Lawrence was a very rich mine, and a mint of money was taken out of it by the company formerly operating it. The mine has lain idle for many years, but has now fallen into the hands of practical, energetic men of capital, who are conservative in their movements, yet bold in action when they have demonstrated the worth of their ventures. The magnificent electric power now operated by the Delmatia company will be utilized for the St. Lawrence, and to that end the line will be extended, making a circuit of ten miles. The availability and cheapness of this power, and the amount that can be supplied, places the company in a position to work the mine to better advantage than any one else. We are confident that the managers of this property will develop a paying mine, if it is there, and if they succeed, Kelsey will be the liveliest mining center in the county. While but little has been said of the Blair mine in the vicinity of the Nine Mile House, the owners thereof are pushing the work. The tunnel started for the gravel deposit is now in over five hundred feet, and has nearly that distance yet to go. A few months more will settle the point as to the richness and extent of the paying channel. The recent finds in gravel along the ridge make almost a certainty of the supposed channel extending through the entire ridge. The late developments in the Larsen claim show a very rich channel at a point three miles below the Blair's tunnel. Mining matters therefore are looking much brighter along the entire ridge. It is reported that the old Larsson mine near Latrobe has been put into the hands of a San Francisco company to operate. In the Gray and Bosquit claim at Pine Mountain, work is being pushed ahead as fast as possible. The upraise and air shaft was recently finished, and the tunnel is being driven ahead with the vein in good rock. The mill is being put in shape, and ore will soon be crushed. There is now a large amount of high grade ore ready for the stamps. The litigation over the Toll House mine at Smith's Flat has interfered somewhat with the working of the claim, pending the settlement of the controversy. It is to be hoped that an understanding will be arrived at that will not interfere with the pushing of this work through.

PACIFIC.—The Pacific Co. is pursuing work all along the line on their claims, from the Van Hooker on the north to the Epley on the south. The vigorous work covering a wide territory has kept Superintendents Rowland and Evans pushed and on the go for some time past. The company is now keeping 40 miners employed all the time. At the Van Hooker they are driving tunnel; at the Old Harmon they are making an upraise and running levels, and have opened out a big ledge. There is a fine body of quartz visible in this mine. Work has ceased temporarily by the True Co., but will soon be resumed. At the Epley, the Pacific Co. is driving a tunnel to open the mine on the 100-foot level. The Gentle Annie mine and mill, which have been idle for some days, expect to start up again on Monday. The Rogers claim at Smith's Flat is steadily working on good gravel, and the Linden is doing the same. The Big Sandy mine at Kelsey, which has been idle for some time past, resumed work on Monday last, and is helping along the Kelsey mining boom. It was reported on the streets during the week that a fine strike had been made in the Pacific. It was well known that the shaft had been sunk to the 1000-foot level, and that prospecting was in progress on that level, a drift being driven in on the ledge. In order to determine the truth of the rumor we called on Supt. Rowland for information. That gentleman, always cautious, and reticent in discussing the affairs of the company, represents, courteously informed us that on Saturday last the workmen had encountered some very good rock in the mine on the 1000-foot level, where they had been working for some time past. As to the extent of the find, and the richness thereof he did not state, as he evidently considered they were matters concerning which the company alone was concerned. The whole community will be glad to hear that good paying rock has been found in this level of the mine, and that development work has shown there is mineral there with depth. When, during last year, the company decided to sink at once to 1000 feet, and by prospecting determine the value of the mine, the proposition was hailed with satisfaction by our citizens, most of whom believed that through prospecting would show the mineral to be there, and rich enough to pay for working. The present discovery proves the permanency of the

mine, and that depth will yield good mineral. A good vein at 1000 feet, and the immense body of ore between that and the surface, means permanency of working, and the employment of a number of men. There is probably not another mining company in the State nor on the coast possessing such a quantity of mining ground that could be worked to such advantage, and at such a small cost, as the group of mines owned by the Pacific. They occupy the main mineral belt of the country, including the "Mother Lode," for several miles north and south, having an almost continuous property. Not one of their mines but what has upon it one or more natural locations for a millsite; and every one of their claims is adjacent to their ditch and can be operated under a water pressure varying in different localities from 150 to 750 feet. With their own ditches and free water, and with every facility for economical handling of ore, this company could handle good ore at a handsome profit.

MAMELUKE.—*Georgetown Gazette*, April 23: T. LeBeuf is pushing in a tunnel on his old Mameluke ledge north of town, at a point in the canyon which will give him more than 100 feet of backs with 100 feet of tunnel. He has a well-defined lead of soft ore about 25 feet wide, on which he has run about 40 feet. The ore prospects very uniformly in free gold. About 900 feet to the south the surface of the lead had been sluiced and worked with rich returns, but work ceased on account of the large amount of water to contend with. Old-timers declare that this is still a rich mine, and that if LeBeuf can succeed in getting his tunnel in to a reasonable length he will get all the money he wants by simply sluicing the material. The mine is secured by a U. S. patent.

DEVELOPMENTS.—*Republican*, April 23: Some new developments are being made at the Gentle Annie mine and rich ore found.

Inyo.

ANOTHER DIVIDEND.—*Index*, April 22: The Newtown Mining Co., with office in Carson City and works at Cerro Gordo, Inyo Co., has just declared dividend No. 2 of five cents per share.

Mariposa.

COULTERVILLE.—*Cor. Mariposa Gazette*, April 23: The Bondurant mine is running at full blast, and is yielding good ore. Mr. S. B. Sample is still working the Black Bart, with good prospects of another pocket. It is hoped his prospects may be realized. W. Davis of San Francisco, and W. Downie of Tuolumne county, are preparing to commence work on their claim at Flyaway, about one mile from the Southern Cross. The Harrison mine owned by H. Boisse and C. L. Mast, is near the Black Bart mine. They have been running a tunnel for the past eight or ten months, and have recently struck good prospects while tapping their main shaft. The rock taken out of this mine was crushed in the Bruschi mill, and yielded \$65 per ton. The Quail mining company are running their mill, and the rock which has been run through this mill has been sufficient to purchase a boiler and engine to run during the dry season. Mr. Bruschi, the owner, is now in the city, purchasing machinery to run by steam power. The sulphurets tested from this time, averaged from \$800 to \$900 per ton. George E. Clark, one of the men who found the pocket in the Black Bart last winter, came into town on the 11th inst., with about 50 pounds of magnificent ore, which he had taken out of the claim recently purchased from Tom Bird. The rock is on exhibition at Bruschi's store. This find indicates that a pocket similar to the one taken from the Black Bart will soon be struck. The Tyro mine which is owned and managed by Charles Sutberland, two miles from Coulterville, is running at present with a full force of men. A deep shaft has been struck on the main ledge, where they have found first-class ore in paying quantities. It is said there will soon be a large mill built at this mine. Several experts have lately examined this mine; they pronounce it one of the best mines in the State. The Sweetwater, Southern Cross, and Mountain View mines, which are situated on Flyaway, have recently been purchased by J. Donovan, of San Francisco. James Dolan is superintending the working of them. Excellent ore has been struck in the Southern Cross, but the others have too much water to be worked at present. They are said, however, to be fully as good as the Southern Cross. The mill at these mines will soon start running under the control of Mr. J. McCort.

Mono.

PROSPECTING.—*Bridgeport Chronicle Union*, April 23: Those well known mining men, Irwin and Callahan, are looking at the Patterson District mines, and will remain there a month or more, intending to give the district a thorough examination. They have an assaying plant on the way up, and propose assaying the whole district. The great depth of snow on the mountains has caused work to be suspended on most of the mines, so that during the past two months very little work was done in the district. Some of the promising mines of the district have been handed to Mr. Irwin, and it is to be hoped he will again be with us as the superintendent of a rich mine, as he is a thorough miner and one of the most popular superintendents we have had in this county, and would be a valuable man for the Patterson District. The result of the observations of these gentlemen will be patiently awaited by our people, who have great confidence in that district.

Nevada.

NORTH BANNER MINE.—*Grass Valley Union*, April 24: The north drift on the 400 level of the North Banner mine is now in a splendid body of ore, the quartz formation being fully five feet in width, and all of it good milling rock, and several feet of it of high grade, much of which yields at the rate of \$50 a ton in free gold, independent of sulphurets and galena, which are also rich. The quartz carries plenty of sulphurets and galena, and its general appearance is that of first-class ore. The ore body is widening as the drift is extended, and there is every probability that the hacks will prove extensive and rich. A crosscut is also being made into the hanging wall of the ledge from the 400 foot station, the indications being that another vein will be cut within a short distance.

The No. 2 and 3 stopes are also yielding good ore, and the mine is producing sufficient to reduce all the ore that can be taken out, and it is expected that it will be necessary to add two more batteries to the mill during the present year. The present mill is new, having been completed last year, and is fitted up with all the latest improvements. The force em-

ployed about the mill and mine is from 35 to 40 men. Last year the mine cleared \$24,000 above all expenses, and the returns up to this date of the present year have been at the rate of more than twice that amount. For this year two dividends have already been paid amounting to \$10,000, while at the same time a reserve fund has been accumulating. The mine gives every indication of being able to continue the payment of regular dividends, and may well be regarded as one of the coming great mines of the county.

IDAHO.—The total amount of dividends paid by the Idaho Mining Co. of Grass Valley is \$5,300,650. ST. JOHN.—There seems to be nothing definite as to the erection of a mill on the St. John mine, as the management is more disposed to do underground work for some time longer before going to that expense. The shaft is soon to be sunk for another level. The present one is at the depth of 150 feet.

COE.—The developments in the Coe mine are reported to be very encouraging, and there is no doubt that the company now engaged in working the mine will put a mill up the present season. It will probably be one of 20 stamps.

Placer.

MOORE MINE.—*Placer Herald*, April 25: Thorpe and the White boys, owners of the famous Moore mine, are raising their dump platforms for the purpose of giving them more dump room, and are making other improvements preparatory to entering on a vigorous summer's work.

Shaasta.

GOLD.—*Redding Free Press*, April 25: The Bell Bros. mine at Sunny Hill is developing some exceedingly rich rock. It assays as high as \$2000 per ton. This ore is shipped as fast as it can be gotten out, and the returns are always satisfactory.

Trinity.

CHANGE IN OWNERSHIP.—*Journal*, April 25: M. C. Parlin and D. C. Dedrick have sold to S. L. Blake their one-half interest in the Chloride mine and several other locations together with mill, etc., for \$10,000. The property is looking very well and the rock is high grade. This is one of the best mines on Canon creek, but there are others equally as good and the amount of haulion that will come out of that camp this summer will surprise some of the old settlers of that section. Since the above was in type Dr. Blake has sold and deeded to C. W. Smith a one-fourth interest in the above-mentioned property.

IT LOOKS WELL.—On our visit to Canon creek this week we took a look at the new strike recently made on the Bailey mine. The ledge is small but very rich and will probably improve as it is developed. At present it is only cut in a few places on the surface but the character of the ore is the same as all the rich ore of the camp.

NEVADA

Washoe District.

CON. CAL. & VA. MINE.—*Virginia Chronicle*, April 25: 1100 level: All work has been confined to retimbering and repairing the south drift, and have started cutting out for a blower station 300 feet south of shaft. 1300 level: The upraise from the east crosscut from the south drift has been carried up 15 feet, total height, 30 feet. From this point are extracting some milling ore. The north drift from the east crosscut from the shaft station has been extended 30 feet; total length, 115 feet, continuing in porphyry, clay and quartz, all showing some value. 1500: The width and quality of the ore which is exposed in the opening 43 feet above the sill floor of this level continues to hold good, and we continue to find this ore body extending to the northeast, and the ore there continues to be of fair quality. We are continuing to stoop out ore of good quality at the end of the crosscut run west from the north drift on the sill floor of this level. 1600: Have continued to extract some ore along and above the line of the drift run east through the old stopes on the sill floor of this level; also from the stopes which are being worked both north and south from that drift. Have continued to stoop out ore of good quality at the point which is 200 feet south from the north line of the mine, and 44 feet above the sill floor of this level. From the main drift running south from the north boundary line of the mine, at a point 220 feet south from that line, the east crosscut has been extended 13 feet; total length, 54 feet; the sill floor of this level penetrating the old stopes through the old timbers. 1650 level: The usual quantity of ore has been extracted from the various openings of this level, and we are continuing to extract ore of good quality in working out from the winze No. 2, at a point 35 feet above the sill floor of the 1750 foot level. Winze No. 3 has been sunk 7 feet; total depth, 80 feet; passing through quartz of low value. From the end of the southwest drift the upraise has been carried up 15 feet; total length, 37 feet, and is now in ore of milling value. 1750 level: The crosscut run west from the drift run southwest from the northwest drift from the main west drift from the C. & C. shaft has been extended 8 feet; total length, 60 feet, continuing in quartz of some value. The drift running southwest from the northwest drift from the main west drift from the C. & C. shaft has been extended in a southwest course 12 feet; total length, 591 feet, continuing in quartz of some value. There has been extracted from all parts of the mine during the week 1,469,940-2000 tons of ore, which was shipped to the Eureka mill. The average assay value of all of the ore worked at that mill during the week (1560 tons) was \$33 per ton. Bullion now on hand in our assay office, assay value, about \$52,000. Bullion shipped to Carson Mint, assay value, \$31,338 29.

OPHR.—From the upraise started in the drift run south from the drift run west from the winze, 122 feet below the sill floor of the 1300 level, at a point 23 feet up, have continued to extract some ore which is stored in the mine of an average assay value of \$22 75 per ton.

MEXICAN.—On the 1645 level the east crosscut, No. 1, started from the main north lateral drift at a point opposite the west crosscut, No. 1, has been extended 40 feet; total length, 791 feet; continuing in a soft porphyry formation carrying fine lines of quartz, the latter showing assay value.

UNION CON.—East crosscut No. 2 on the 1465 level, started from the north lateral drift at a point 200 feet north from the south boundary line of the

A RICH find has been made a mile north of Spring City, Nev. This is a lode that parties have been trying to find for quite a number of years, as rich float has been found on several occasions upon the hillside by different parties. *The Silver State* is of the opinion that this find will be apt to create another boom for Spring City, and will be an encouragement for the new company that has but recently come into possession of the Paradise mines to push their reduction works to completion.

MECHANICAL PROGRESS

Blacksmithing in 1747.

We reproduce below from *Blacksmith and Wheelwright*, as a curiosity, the essential portion of an article on blacksmiths, which appeared in a small book published in London in 1747. It will be observed that the blacksmiths of those days were expected to make almost every article of iron work in general use. Any such thing as what we now call a "machine shop" or a "tool factory" was unknown in those days. The blacksmith did it all.

Blacksmiths.

By this Term it may be understood in general all such work or forge iron in any manner whatsoever. But in particular it signifies one who makes the Iron-work used in and about Buildings, Kitchen-furniture, &c., though it now is almost an Affront to call any one a Blacksmith, the Word Smith being used alone; or, for the sake of Distinction, with the Name of the Branch he mostly works in prefixed to it. The first which, in Order of Alphabet, occurs to me, is the Anchor-smith, whose business is to make the Iron-part (for the Stock, or Guide, is generally of Wood) of Anchors of all sizes, which differ so much as from a Quarter of Hundred Weight to a Ton or more, according to the Burden of the Ship or Craft.

It is a very useful, extensive, and considerable Part of Smithery, at which the Masters get Wealth; but then it takes up a good deal of money (500 l. at least) to build a Forge, find materials, stock it with iron, and pay many Hands Weekly.

It is laborious Work, being little else but blowing and tending a vast Fire, and striking with large Sledge-hammers, though in doing this they have a Slight and a clever Knack of following one another's Strokes, in such a manner that they seem to keep time, the Noise of which, at some distance, sounds as if they were heating Changes, there being often six, eight or ten of them striking at one Anchor.

They take Apprentices sometimes with Money, and sometimes without. Their Hours of working are somewhat uncertain; for, when they once light their Fire, which is expensive, the must finish what they began.

Anvil-maker, or Smith, is he who forges, files, and planishes the faces of all sorts of Anvils, Hammers, &c., for their Brother-Smiths, and other Handicrafts who use them, and these are all such almost who work in any sort of Metal. It is not quite so heavy a Labor as that just mentioned; though some Anvils are very weighty.

File-Maker's Business is to shape, temper and cut all sorts of Files; a very necessary Tool, and in continual Use with almost all Artificers, but chiefly those who work on Metals. This is much lighter Work than the other two.

Jack-smith, which, and making Steeple or Tower-clocks, generally make one Branch, and requires, besides Labour, which is middling, some Art, Invention, and Knowledge in Figures and Lines; and many, who have exercised this Part of the Trade, with some Reading and Application, have become great proficient in the Mathematics as well as Mechanics.

The Tire-smith makes all sorts of Iron-work for Coaches, Waggon, Carriage, and all other kinds of Carriages whatsoever; very rarely making any thing else; and it is pretty hard work.

The next, and last, that presents itself at present, is the Ship-Tire-smith, who makes all the Iron-work belonging to Shipping and Craft (except Anchors), and sometimes them likewise, especially the smaller Sorts, the Articles of which are very numerous and the Work hard enough.

They take, in common, from 5 to 20 l. by chance upon an Apprentice; their Honor of working are from five to eight and their wages, in general, 8s. a Week, and small Beer, though some clever Artificers in the noiser Branches get more.

A little money will set up a common-working Smith; but if he intends to keep a Stock of any Kind, his Cash must be increased in Proportion.

It is to be observed, that most of the above articles go into the Ironmongers Hands for Sale; as Anvils, Files, Locks, Screws, Shovels, &c., for which Reason the Makers seldom keep Stocks by them, but dispose of them as soon as made, whether bespoke or otherwise.

They were incorporated into a Company, by the Title of Blacksmiths, in the year 1571, in the Reign of Queen Elizabeth, and confirmed by King James I. Livery-fine 3 l.

Their Hall is on Lambeth-hill, in Thames-street; and their Court-day on the first Thursday of the month.

They have also a Stand in Cheap-side, in which they fit to attend the Lord-Mayor on the Day of his Installation.

Arms. Sable a Chevron between three Hammers Argent, handled and crowned Or.

Motto: By Hammer and Hand, All Art doth stand.

COPYING MECHANICAL DESIGNS.—A contemporary asks to what extent may mechanical designs be copied? In answer to its own question it says: From a legal standpoint the answer would be: Only up to the point of infringement. But in the current practice in the machinery trades, unless the design be wholly

novel, little, if any, objection is made to infringement in the line of improvement. Hammers, saws, chisels, files and the like are constantly undergoing changes in design; he whose design is improved upon, borrowing the improvement, adding something to it, and selling it as his own; another taking it from him by similar means, and so on. A large manufacturer of machinery said to the writer recently: "It doesn't pay to bring suits where the interference is very clear. Saws and planers and drills and the like have been made time out of mind, their principles having been utilized in a thousand and one ways. Even where one of our draughtsmen leaves us and goes to a rival house, carrying many of our ideas with him to be worked out with close resemblance to our own designs, it scarcely pays to fight. We take the result and make as much improvement as we are enabled to and let it go at that. The machinery trade generally is doing the same, the result being as usual—the man with the longest pole gets the most persimmons."

IRON THE CIVILIZING METAL.—An International Iron Congress recently met in New York. Among its members were not only skilled manufacturers, but men of high attainments in science. They come from almost every civilized country in the world. It is presumed that each brings with him some knowledge that is unknown to the others. Iron has been wrought since the days of Tubal Cain, but there are still many things to be found out about it. Indeed, there are good reasons for believing that many processes employed by the Saracens and others are now numbered among the "lost arts." No one can now produce steel equal to that in the Damascus sword blade. But the present age has witnessed wonderful changes in the manufacture of iron and steel. The hot-blast reducing furnace and the Bessemer converter are among the greatest inventions of all times and countries. They have rendered the production of iron and steel speedy and cheap. Other discoveries and inventions are needed to render these substances still more useful to the world. Iron is fast superseding wood in the construction of vessels and bridges. Wire has taken the place of boards and nails in the building of farm fences. Iron posts are fast coming into general use. More buildings, chiefly composed of iron, are being erected every year. The cheaper iron and steel become the greater the number of purposes to which they will be put. The civilization of a country can be accurately estimated by the amount of iron it uses. Barbaric peoples often use much silver and gold, but they make little or no use of iron. What are known as the precious metals are employed in the fine arts, but iron is the metal wanted in heavy arts. It is capable of many properties, some of which fit it to almost any use. No country has as much iron ore, coal and wood for producing charcoal as the United States, and it seems somewhat strange that, in face of the facts, the pretense can be maintained that we can not produce iron and steel as cheap here as they are produced elsewhere. It is certain that we can, though interested manufacturers are constantly trying to convince legislators that we can not.—*Southern Progress.*

A NOVELTY IN PROPELLER SCREWS.—A recent Baltimore dispatch says: Shipbuilders and marine men will this week be permitted to inspect the strange-looking new steamer Howard Casard, which Mr. Myer, the inventor, asserts will revolutionize ocean travel. The shaft and propeller will be adjusted, giving the maritime people an opportunity to see in place a four-bladed screw, each blade of which is set on a different line of rotation, or in spiral order, increasing in pitch toward the stern, as compared with preceding blade or blades. The object is to embody in a single screw as much surface as now exists in a twin-screw driven by the same amount of power. The inventor asserts that this feature of the vessel is an experiment. The Casard will soon receive the finishing touches to make her ready for the dock trial, which will take place about April 15th.

LARGEST FORGING PRESS IN THE WORLD.—The first large forging press that ever was made is now in full work at the armor plate factory, in Sheffield, of John Brown & Co., Limited. It is of 4090 tons, and is worked by 2000 horse power pumping engines, and commanded by power traveling cranes, capable of lifting 150 tons. At the works of Mr. Krupp, and at those of Messrs. Schneider & Co., in France, similar processes are now at work, and one has been erected at the Terni Works, in Italy, where the forging of guns and armor plates is largely carried on. A 4000-ton press, ordered by a Chailion company, has been delivered, and is now in course of erection.—*The Mechanical World.*

ANCIENT AND MODERN PRACTICE IN PUMPING machinery is very well exemplified at the Jersey City pumping station. There are in one house two immense, by contrast, pumping engines of the old English type—weighted plungers and a wilderness of rods and levers and clap-traps about the engines—while in another and more modest building are two compound direct-acting pumping engines, occupying but a small part of the space, but, as one of the engineers remarked, "beating the big engines out of sight." The day of these old ponderous pumping machines has gone by, but they were excellent in their day, the better types of the present day only denoting the progress that is to be expected.

SCIENTIFIC PROGRESS.

The Causes of Rust.

An Eminent Professor Shows That it is a Rather Curious Combination That Causes Iron to Rust.

At the regular monthly meeting of the Leeds Association of Engineers, held in the Chemical Lecture Theater of the Yorkshire College, England, Prof. Smithells, of the college, delivered an interesting address, for extracts from which we are indebted to *The Ironmonger*.

He remarked that if they were to do anything on the subject of rust, they must begin by studying the conditions under which rust was formed, getting to know as much as possible about the phenomenon itself. The question was, was it the chemist or engineer that was to tackle the problem. The answer in this case, as in so many others was, that the two must go together; they must combine theory and practice. His object would be mainly to take the chemist's attitude, and to explain to them the chemistry of rust, and to hint at one or two ways in which attempts have been made to obviate its formation. Rust, of course, was more or less a general phenomenon. It was not restricted to iron, but was most noticeable in the case of iron because iron was the most abundantly used metal, because the rust of iron formed rapidly, because it assumed a scaly character, because of its colors, and because of the fact that rust was a thing that appeared to grow in the case of iron, but it did not grow so rapidly, if at all, in the case of other metals. Other metals, of course, did rust.

They knew they could not expose the bright surface of copper or zinc without the surface becoming dim. These metals might, therefore, be said to rust in their respective ways, but the rusting was very slight as compared with iron, which was the most susceptible to rust. Iron rust was found to consist of three elements—iron, oxygen, and hydrogen. That rust did contain water could be shown by the simplest experiments. That rust were oxides they could easily prove, because they could produce rust by burning metals in oxygen alone, hence there could be no other element present, but the way that might appeal to them would be by getting the metal back again from the rust, and the oxygen as well. The lecturer demonstrated this by experiments with the rust of quicksilver, and also with iron rust. The experiment he had done he remarked was a very suggestive one; because in getting the iron back from the rust in that particular operation he had done what had to be done so often in the process of soldering. They knew that before they could unite two pieces of metal by solder they must use a flux. The reason was that the two metals might be covered with a thin film of rust, and the solder would not adhere to these two nuclear surfaces.

What was the cause of iron rust? They all knew that rusting was favored by the presence of the air, and by the presence of moisture, but they wanted to know which of these two was the real cause, whether both were necessary, and whether anything else took part in the process. They wanted to know why rusting went on so rapidly and at different points, and how it was effected by the different compositions and the qualities of the metal, and by impurities in the metal, in the air, or in the water. Professor Smithells then showed some specimens of iron in jars, which he had been preparing for some time. One was a piece of iron in dry oxygen, and he explained that that would not cause the iron to rust. Next he showed a piece of iron which had been sealed up in water for some days, remarking that it was found that when they excluded air and other gases from the water no action took place, and a second conclusion was that water alone would not affect iron.

The next question was, would air and water together affect iron? That experiment had been done, and it had been shown that wherever action had taken place at all, the action had been exceedingly insignificant, and the question arose, what was it that was absent and that caused the rust? The one ingredient which was present in one of the jars, and was not present in the cases he had shown, was carbonic acid gas. Carbonic acid gas existed in the atmosphere to a small extent, and it was this gas in the air that was all-important in the operation of rusting. Pure air, pure water, pure carbonic acid would not act singly upon iron; pure water and pure air would not act together upon iron; carbonic acid and air would not act together upon iron, but when they had carbonic acid water, and air together, they got symptoms of rust. It was carbonic acid that really set rust on, and when it was found the carbonic acid was liberated and attacked the layer beneath. That was why rust has got the property of traveling inward.

How could they prevent this action of rusting? There were many things which had been tried. They might paint the iron, and if they observed certain precautions they might have an effective method. One precaution was that the metal must be perfectly clean. A spot of rust embedded below a coat of paint would often break out of itself. Then there was the method of covering the iron with oils and tarry matters. There was also the process of galvanizing iron; the process of enameling, which was very useful for small articles, but the enamel was apt to chip off; and there was the Bower-Barff process, which was worked at

Keighley, and which was an admirable process. Alluding to boilers, he said, by putting soda into them, not only did they correct acidity of the water, but they introduced something which would absorb the carbonic acid gas, and prevent it acting in a rusting capacity.

WHAT KEEPS THE BICYCLER UPRIGHT?—Let us suppose a cyclist mounted on his wheel and riding, say toward the north. He finds himself beginning to tilt toward his right. He is now going not only north with the machine, but east also. He turns the wheel eastward. The point of support must of necessity travel in the plane of the wheel; hence it at once begins to go eastward, and, as it moves much faster than the rider tilts, it quickly gets under him, and the machine is again upright. To one standing at a distance, in front or rear, the bottom of the wheel will be seen to move to the right and left, just as I moved the foot of the skeleton frame a moment ago. I conclude, then, that the stability of the bicycle is due to turning the wheel to the right or left, whichever way the leaning is, and thus keeping the point of support under the rider, just as a boy keeps upright on his finger a broomstick standing on its smallest end.—*Popular Science Monthly.*

[What keeps a hoop in an upright position when thrown off to trundle by itself? Does it keep its position by turning to the right or left—or by its centrifugal action? What is the difference between a bicycle wheel and a hoop in motion?—EDS. PRESS.]

THE RAPIDITY OF THOUGHT.—Much speculation has been set on foot in regard to the rapidity of thought; but Prof. Donders of Utrecht has recently made some interesting experiments in this direction by means of two instruments, which he calls respectively the "tachograph" and the "nerveometer." His experiments thus far show that it takes the brain one sixty-seven hundredths of a second to elaborate a single idea. He says: "Doubtless the time required for the brain to act is not the same in all individuals. I believe, however, that these instruments may be so far perfected that we shall be able to determine the mental caliber of our friends without our friends knowing that we are testing their aptness." And again: "For an eye to receive an impression requires seventy-seven hundredths of a second, and for the ear to appreciate a sound, one hundred and forty-nine hundredths of a second is all that is necessary, which, however, acts with nearly double the rapidity of the eye."

THE SOURING OF MILK IN THUNDER STORMS has just received a scientific explanation at the hands of an Italian savant, Prof. Tolomei. He has found that the passage of an electric current directly through milk, so far from souring it, actually keeps it sweet, so that it does not turn until the sixth day; when, however, an electric current is passed over the surface of milk it soon becomes sour, and this the professor attributes to the generation of ozone, since the souring is more rapid when the current passes silently than when it is discharged explosively, more ozone being generated by the former than by the latter method. The fact that the souring of milk can be retarded by so simple a procedure as the passage of an electric current may prove of practical value, and offer a safer way of preserving milk than by the use of antiseptics.

SHOULD THE GREGORIAN CALENDAR BE SUPERSEDED?—A correspondent of the *Scientific American* says: The Gregorian calendar, as it is, loses one day in 3600 years. The rule for leap year is, add one day to February every four years, unless it be divisible by 400. It would be much better to add one day to February every five years, two days every 25 years, and three days every 450 years. Thus every fifth year, February would have 29 days, and the year 366 days; every 25th year, February would have 30 days, and the year 367 days; every 450th year, February would have 31 days, and the year 368 days. By this plan, every year ending in 0 or 5 is a leap year, and could be known at a glance. The error in this amounts to one day in 50,000 years.

SINGULAR.—A gentleman put on a pair of woolen stockings over his silk ones on a cold winter day. At night, he pulled the stockings off without separating them, and was astonished by the crackling noise and even the sparks of electricity which followed. When he drew the silk stockings out of the woolen ones, the electrical attraction was so manifest that the stockings would incline toward one another, when held some distance apart. It happened that the silk stockings were black and the woolen ones of light color; but when he tried the experiment with both stockings of the same color, there was no electrical manifestation. Why?

HOW THE DIAMOND OCCURS.—Geologists have proved that the diamond mines of South Africa are situated in vents or chimneys, varying from about 70 feet to 1500 feet in diameter, and descending vertically through the schists, which form the ordinary strata of the district. These vents are filled up with fragments of silicified and magnesian rock, in which the diamonds are scattered, and before the digging began, each was capped by a hillock or "kopje." They are 17 in number, and run in a straight line about 120 miles.

GOOD HEALTH.

Remedy for Blood Poisoning.

It is claimed that Mr. Ernest Tanner of Baltimore, Md., a gentleman without affix of "M. D." to his name, has compounded a remedy to counteract the ill effects from the bite of rabid animals, reptiles, insects, etc., all of which exist in such numbers that members of the human family are constantly exposed. The remedy is a vegetable compound embodying rh grass, plantain and hazel, all easily obtainable and manufactured by a simple and inexpensive formula. This medicine is taken internally, and also applied externally to the bite. A good, reliable remedy should be in every household, as poisonous insects are liberally applied to nearly all communities, and in localities abounding in venomous snakes, no one should be without a ready antidote.

It is claimed that this remedy only requires a little systematic effort and energy to develop into a profitable and beneficial article of large demand. If the gentlemen of the medical profession would only throw aside their professional exclusiveness, now and then, and devote a little attention to such announcements as the above, they would add, much more frequently than they now do, to their catalogue of remedies.

The history of medicine shows us that the unprofessionals have, by either accident or study, added quite as much, if not more, to medical progress within the last three centuries, than the profession itself has done. An important factor in regard to these unprofessional discoveries is the fact that they have in nearly, if not every instance, been derived from the vegetable kingdom, while the chief study of the regulars has been almost exclusively confined to the mineral kingdom.

The tendency of the day is to substitute vegetable for mineral derivatives in the practice of medicine, and there is good reason to believe that the day is not far distant when the shelves of our druggists will be almost completely relieved of the dangerous and poisonous nostrums which owe their origin chiefly to the mineral resources of the chemist. Nature seems to have provided in the vegetable kingdom remedies for almost or quite every ailment. We have evidence of this in the animal kingdom. Nature seems to have given an almost universal instinct to animals to search out and feed upon certain herbage, which will remove almost or quite all the ailments which come to them in a state of nature. There are, however, ailments which afflict them when under restraint or an abnormal mode of life, that they do not seem to know what to do for. Man, in such cases, generally intervenes with his mineral preparations. The now well-known cancer remedy, which is meeting with such remarkable success in this city, is composed exclusively of vegetable compounds and applications of a non-caustic nature, helped out only with new sweet cream or butter direct from the churn—the smallest possible remove from the vegetable kingdom. This may be regarded as a most successful application of vegetable remedies to one of the most persistent and malignant ailments with which humanity has ever been afflicted. The malignant nature of this ailment is especially manifested when treated with the knife or the poisonous mineral application, so universally, yet so unsuccessfully, employed by the medical faculty at large.

THE ELECTRIC LIGHT IMPROVES THE APPETITE AND STIMULATES SLEEP.—It has been remarked as snowing what a powerful element of health the electric light is, that the general health of those who use it improves, their appetite and their ability to sleep increase, and the visits of the doctor become less frequent. This is especially apparent in the statistics of the attendance of working people in factories and other places. In the savings bank in Queen Victoria street, London, where 1200 persons are employed, the absences from illness have been so far reduced that the extra labor gained is said to have paid for the electric light. The influence of artificial light on the eyes has also a very important sanitary bearing. It has been asserted that the injury to the eyes, of which the growing short-sightedness of the day is but one result, is due to the heat rays and not to the light rays. If that be so, the electric light is less injurious than any other. If the eyes are exposed to the strong light of the arc lamp, its ultra-violet rays have a painful effect, but no one has ever complained of the influence of a steady glow lamp upon the sight, and it is possible to read and write for many hours by such a light without experiencing the least fatigue.—*New York Sun.*

A CURE FOR DIPHTHERIA.—The following remedy was discovered in Germany, and is said to be the best known. At the first indication of diphtheria in the throat of a child, make the room close; then take a tin cup and pour into it a quantity of tar and turpentine, equal parts. Then hold the cup over a fire so as to fill the room with fumes. The little patient on inhaling the fumes will cough up and spit out all the membranous matter, and the diphtheria will pass off. The fumes of the tar and turpentine loosen the matter in the throat, thus affording the relief that has baffled the skill of physicians.—*Hall's Journal of Health.*

PREVENTION OF MERCURIAL POISONING.—Jules Mayer, an employee in a French mirror factory,

has lately ascertained that by scattering through the working rooms a pint or a half-pint of aqua ammoniac every evening, all danger from the absorption of mercurial vapors will be in a measure prevented. This practice has now been in use for several years in his establishment without the occurrence of any new attack of mercurial poisoning.

USEFUL INFORMATION.

THE SMOKE NOISE IN CHICAGO.—The report of Smoke Inspector Young, of this city, published in the *Tribune* of Saturday, gives reason to hope that ere long the dreadful smoke nuisance will be reduced to an endurable state. The railroad-locomotive part of the problem has long been recognized as the most difficult to deal with, but it now appears that the railroad officials see that it can be abated, and many of them are working to that end. Some of the roads have abated the nuisance on all their locomotives which run within the city limits, and some of the rest are making the required changes as fast as they deem practicable. The others report little progress, which may be accepted to mean that they have not entered into the spirit of the proposed reform, and need to be spurred up to a performance of their duty to the community. The Smoke Bureau has decided that sufficient time has been given for compliance with the anti-smoke ordinances and that a vigorous prosecution will be instituted against the dilatory ones to see what effect fines will have. This should not have been promised, like so many others that have been made, but should be carried out faithfully. The Smoke Bureau reports that much has also been accomplished in abating the smoke nuisance in factories, hotels, and office buildings, and the clearer skies with which we have been favored in the last few weeks show that this is not merely an idle boast. But there is a vast deal yet to be done before the course is removed and the air rendered clean.—*Chicago Tribune.*

[Why cannot some steps be taken in the same direction in San Francisco. Such action is beginning to be greatly needed. EDS. PRESS.]

THE GREATEST IRON PORT IN THE WORLD.—Escanaba is the county seat of Delta County, Michigan. It lies at the foot of the great pine forests, and overlooks Little Bay de Noquet, the headwaters of Green Bay. Five years since it was practically a village in the wilderness. To-day finds it a city with a population of 8,000, lighted by electricity, having a well equipped fire brigade, waterworks with a capacity of 4,000,000 gallons per day, a high school and three other schools, six churches, three newspapers, a railway station where 216 trains arrive and depart daily, and it will shortly have an electric street railway in full work. Its annual retail trade is estimated at \$3,000,000, and its wholesale trade, including iron ore, pig iron, lumber, and coal, at about \$25,000,000. According to Mr. Nurey's carefully written report, capable of the fullest verification, Escanaba is the greatest iron port of the world. He tells us that during the navigation season of 1890 it shipped 3,700,000 tons of iron ore, or nearly double that of all the ore ports of Michigan, Wisconsin, and Minnesota combined. Its lumber output amounted to about 120,000,000 feet, while the freight capacity of the vessels entering and clearing from its port exceeded 8,000,000 tons. This compares with the tonnage of the greatest seaports of the world, which are: (1) London, 19,000,000; (2) Liverpool, 14,000,000; (3) New York, 11,000,000; and next comes Escanaba with 8,000,000 tons.

UNINFLAMMABLE WOOD.—Wood cannot be rendered incombustible, or, more strictly speaking, non-alterable by heat, but its non-inflammability may, to a considerable extent, be insured so as to preserve buildings from a limited and temporary fire, at any rate until assistance arrives. It is, however, hopeless to expect a building encumbered with inflammable substances to pass through such a test uninjured. The methods of preserving wood against fire are of two kinds—the injections of saline solutions and the application of a paint or coating. The former appears but little practical; and, indeed, short of proof to the contrary, it must be considered dangerous in the case of wood of large dimensions. This system is, however applicable to small pieces of wood. Of all the substances recommended, a concentrated solution of phosphate of ammonia is undoubtedly the best, the use of this substance, notwithstanding its high price, possessing such great advantages that it should be employed in all cases where expense is no object. In the majority of cases, however, coating with a brass is the only practical solution of the question, and Professors Bondin and Denny, of Ghent, recommend as the substance most suitable for use in this manner cyanide of potassium and asbestos paint.

THE PARTITIONMENT OF AFRICA.—Only 2,500,000 of the 11,000,000 square miles of Africa remain in the hands of native rulers. France has 2,300,247 square miles, England 1,900,445, Germany 1,035,720, Congo Free State 1,000,000, Portugal 774,993, Italy 360,000, Spain 210,000. While the share of France is largest, England's is most valuable.

TO SOLVE THE CHEAP FUEL PROBLEM.—Among the latest attempted solutions of the cheap fuel problem is the method of a German inventor, who proposes to manufacture gas by

dropping a stream of crude petroleum through a blast of cold air from a force pump. The gas thus obtained will be confined in a regular cylinder open at one end, where it will be lighted. This produces an intensely hot flame of several feet in length. By means of this flame the inventor proposes to heat boilers, and he maintains that the heating of large blocks can thus be reduced very considerably.—*Com. Ad.*

STEAM BOILER NOTES.

NOTES ON STEAM FITTINGS.—The nozzles of a large steam drum, that is, those forming the connection between the drum and the boilers are very seldom put on as they should be. For drums, up to ten inches in diameter, which are made usually of ordinary steam pipe, the connections from the boiler are generally made by means of an ordinary screwed tee. The pipes leading from the drum to the engine and other parts of the works are usually the full size of the drum. Often they are not over six inches in diameter and are taken out by means of the usual form of fittings. As the pipes are led horizontally from the drum with all centers at the same height a chance is left for water to collect in the lower part of the drum, which is liable to cause trouble unless a drip is attached. This drip must be connected to all the boilers and supplied with valves so that the water may be returned to any boiler of the battery that may be running alone. There is no particular harm in this arrangement except that it is in the nature of a makeshift. The best way of making nozzle attachments to drums of large size either riveted or made up of welded pipe when the branch pipe is taken out on the center, is to have the cast iron screwed nozzle riveted to the inside, which allows the rivets to be driven from the outside. The iron of the drum is brought closely down to the flange of the nozzle and the canking edge is outside, thus allowing of a good job at low cost. Besides main steam pipe connections it is advantageous to use eccentric fittings as couplings for long lines of pipe and especially on pipes used in steam heating systems. With the ordinary style of couplings, when the size of a steam main is reduced, it is necessary to put in a drip pipe which sometimes involves considerable expense, where if eccentric reducing couplings (which cost no more than the others), were used, the condensed water would flow on freely.—*Exchange.*

BACONING OR BULGINO OF BOILER PLATES over the fire is in nearly every case traced to the use of oil in the boiler. Oil is sometimes inadvertently fed to boilers by false economy of turning the exhaust steam into the water tank, where the engine oil is caught and pumped into the boiler. Oil gathers the soot and dirt into a cake, which may settle on the fire sheet and thus prevent contact with the water. The intense fire heats the iron red hot and the pressure bulges the plate. Scale, if allowed to accumulate in large quantities, may possibly also cause bulging, but we have yet to see the first case in a cylinder boiler that was not traced to oil.

A POINT REGARDING FEED WATERS FOR STEAM BOILERS.—Mr. Leo. Vigon's new method of analysis applicable to industrial waters which have to undergo a chemical purification leads him to the conclusion, according to *Moniteur Scientifique*, that in order to determine the elements of chemical purification, or the anti-incrustation agents, it is sufficient to determine the free or the half combined carbonic acid, and to determine the quantity of sodium carbonate necessary to convert the soluble salts of calcium and magnesium into carbonates which are chemically neutral.

WATER CONSUMPTION.—The actual water consumption of an engine is always larger than that shown by the indicator. The amount of this unindicated loss is very nearly the same in an engine under different loads. At 40 pounds mean effective pressure it is a safe rule to assume an unindicated loss of 25 per cent. The percentage of loss will therefore be greatest under light loads.

A SAFETY-VALVE, in order to be, in reality, what its name implies, should be so proportioned, fitted up and piped, as to insure the boiler to which it is attached against an over-pressure of steam, when all other outlets are closed and a brisk fire in the furnace. How many engineers who read this have ever tested their safety-valves in this way?

AN ENGINEER is very liable to grow careless of the dangers about him as he becomes familiar with his work. If care is ever necessary in dealing with machinery it is always necessary, and it often proves disastrous that familiarity with danger brings contempt as well as in other cases to which this saying applies.

A HIGH-PRESSURE ENGINE runs by the direct pressure of the steam only. In a low-pressure engine the steam is condensed with water or otherwise, and a vacuum formed in front of the piston, adding from thirteen to fourteen pounds per square inch to the power of the piston.

SATURATED STEAM at 60 pounds pressure to the square inch has a temperature of 292.52°F., and one pound of the vapor occupies a volume of 7.0328 cubic feet, and one cubic foot weighs 0.14219.

SHOP NOTES.

NOTES ON BELTING.—A prominent belt maker says all ordinary pulleys up to twelve inches broad should have a round or corve of not less than one-eighth of an inch; others, ranging up to twenty-four inches broad, should have a curve of not less than five thirty seconds of an inch; while the curve for such as are over twenty-four inches broad should not be less than one-fourth inch. For pulleys twelve inches in diameter and under, running at very high speeds, the corve ought not to be less than double the foregoing.

It does not take half the power to make a quarter turn with belts that most millmen imagine, if a belt long enough is used, and pulleys for guides the same as for shaft wheels. Place the shaft wheels overhead as close together as possible, and let the belt hang straight down from both sides of both wheels to the floor. It will take three wheels, six hangers and three shafts to complete the system, to say nothing about a half-dozen rollers, but it will take care of itself for years, and no one will ever know that an angle turn was ever made in the mill except for the space that it occupies.

As showing the effect of elasticity of belts, it is a fact that owing to the slip, elasticity and thickness of a belt the circumference of the driven pulley does not run as fast as the circumference of the driver, and taking two pulleys of the same diameter, one can be made to run twice as fast as the other without slipping by using an elastic rubber belt.

TO REMEDY SWAYING AND OSCILLATION.—Frequently the oscillations of the main belt in a mill come in unison with the heat of the engine, and a pretty perceptible slapping about of the belt is noticeable. The heat of an engine will often come in sympathy with the rhythmic sway of the building, and so increase it as to be very perceptible. If this were continually going on in exact time it would become so great in time as to be dangerous; but one or the other gets ahead and mixes the movement, so that it gradually ceases until they are again in unison. If the speed of the engine is changed in either case the swaying will be kept mixed all the time instead of occasionally. On long lines of shafting this will appear also, the pull on the belt at the commencement of the stroke being in unison with the spring of the shaft, thus causing a marked oscillation. The same remedy is applied here, to mix the two movements purposely, and the trouble is partly removed, if not entirely.

COMBINATION TOOLS.—Every man who has done outside work, knows how troublesome the augers and long bits become when packed with their handles in a tool-chest or box. This trouble may be overcome by fitting all the augers to one handle, and all the bits to one brace; then make two chucks, one to fit the brace, the other to fit the auger handle. Make all the augers to fit the brace chuck, or rather the chuck to fit all the augers, then make another chuck to fit the auger handle and all the bits. With this combination, all the bits, augers and handles are interchangeable, and never a job can be brought along but can be handled. In addition to the handles, a ratchet chuck may be made for boring in a corner, or where there is not room enough to swing brace or auger handle.

DEFICIENT WORKING OF MACHINERY.—To locate the deficient working of machinery with numerous points of friction causes often both annoyance and waste of time, owing to the surrounding noise interfering with the observation of the sound to be isolated. The *Revue Industrielle* mentions as an effective and exceedingly simple means of overcoming this difficulty the use of a rubber tube about a metre long, one end of which is placed in the ear and the other passed over the suspected spots. The vibrations from all other parts of the one covered being excluded, it is an easy matter to locate jarring noise, and when found, to observe the intensity and periodicity with which it occurs.

HOW TO FIND THE EXTENT OF A CRACK IN METAL.—A crack in a piece of metal is prevented from extending farther by the well-known means of drilling a hole where the rent ends; but when the hole is not bored on just that spot the crack is apt to continue beyond the hole. To facilitate the search for the exact point, *Revue Industrielle* recommends moistening the cracked surface with petroleum, then wipe it and then immediately rub it with chalk. The oil that has penetrated into the crack exudes and thus indicates with precision where the crack stops.

TEMPERING BRASS.—Brass which has been rendered hard by compression may be tempered the same as steel. To do this a piece of polished steel is placed on the article to be tempered, and heat is applied so as to affect the steel and brass equally, and the temper of the brass will be indicated by the color of the steel.

STEAM is a willing servant, and will turn any crank and ask no questions; but it depends upon who made the crank how long it keeps turning.

HANGERS with adjustable boxes will be found to be the most convenient for keeping the shafting in line.



A. T. DEWEY.

W. E. EWER.

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Saturday, May 2, 1891.

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Business Announcements.

[NEW THIS ISSUE.]

Ore Concentrator—Geo. E. Woodbury.
Gold Mines for Sale—Foster, Grass Valley.
Flax Packing—W. T. V. Schenck.
Hopkins Academy—W. A. Anderson, Oakland.

See Advertising Columns.

Passing Events.

This has been "President's Week" in San Francisco, and the Chief Executive of the Nation has received a hearty welcome and such attentions as become his station. The city has been crowded with visitors and has been in holiday attire.

The coast defense vessel, Monterey, was launched at the Union Iron Works' shipyard this week, in the presence of the President and his party and many thousand people. The launch was, in every way, successful. Two more Government vessels are on the stocks at the works, one of them the largest ever contracted for on this coast.

The discoveries in the Deep Creek country, Utah, are still attracting great attention. The number and richness of the strikes in the camps of that district will still further draw attention to Utah's great mineral resources, and furnish a new field for mining labor.

The remarkable advance in the business of granite quarrying in California, referred to in another column, is only another proof of the variety of mineral resources of this State, only now being properly developed.

California Granite.

Our Important Quarrying Industry.

Of the various kinds of stone quarried in the United States, granite is capable of the widest application, when all the uses to which the stone is put are considered. During the past ten years a wonderful increase is shown in the development of the granite quarries of this country, owing to the demand for the stone for building and other purposes in the large cities. A very notable increase in production has raised California from the ninth place in the Tenth Census to third place in the Eleventh. Massachusetts and Maine are still the foremost granite-producing States, but to hold these positions the increase in value of output has been very great. The great increase in production in California is largely due to operations in the Folsom granite quarries, much of that stone having been used in the construction of the dam, the canal and the power-house at the prison. That work has been chiefly done by prison labor. In Sonoma county granite is extensively quarried for paving blocks. The stone is really basalt, and has given satisfaction for paving purposes. Most of the paving blocks of the State come from that county.

The following kinds of granite are being quarried in this State: Biotite granite, Placer county; hornblende-biotite granite, Placer and Sacramento counties; hornblende granite, Placer county; quartz diorite, Placer county; basalt, Solano, Sonoma and Alameda counties; andesite, Shasta county; andesite tufa, Solano county; quartz porphyry, San Bernardino county; basaltic tufa, Tehama county.

A Census Bulletin just issued by Special Agent Wm. C. Day, on "The Granite Industry of the United States," gives in a condensed form many interesting facts, but we have only space to collate what relates to California.

There are at the present time 26 granite quarries in this State, there being but three others which have a greater number—Massachusetts, Maine and New Hampshire. The locations of these quarries are as follows: Five at Agua Caliente, Sonoma county; one each at Angel's Camp, Calaveras county; Arcata, Humboldt county; Berkeley, Alameda county; Monrovia, Los Angeles county; Cordelia, Solano county; Declezeville, San Bernardino county, and Exeter, Tulare county; five at Folsom, Sacramento county; one each at Grass Valley, La Canada, Los Angeles county, and Lakeside, San Diego county; six at Lincoln, Placer county; two at Victor, San Bernardino county; one at Los Guilcos, Sonoma county; two at Nevada City; one at Novato, Marin county; two at Oakland; one at Temescal, Alameda county; one at Penn's Grove, Sonoma county; four at Penryn, Placer county; three at Petaluma; three at Raymond, Fresno county; ten at Rocklyn, Placer county; two at Loomis, Placer county; one at National City, San Diego county; two at Temecula, San Diego county; five at Sonoma; four at Santa Rosa, and one at South Gullcoos, Sonoma county.

It will thus be seen that granite is found in all parts of the State. The most extensive quarries are located in Placer county, and the granite from them is extensively used in San Francisco for building purposes.

The statistics with regard to the production of granite in California furnish many points of interest. Thus, the 76 quarries in this State produced 4,761,411 cubic feet of granite last year, the value of which was \$1,329,018. To do this work 1803 men and boys, 139 animals and engines of 1026-horse power were employed. The total expense incurred was \$973,276, of which \$809,205 was for wages, \$131,837 for supplies, and the balance for incidentals. The total amount of capital invested is \$2,829,794, which is nearly one-sixth of the total for the entire country. The earnings of the employees has a high standard in California by comparison with the other granite-producing States. Foremen average \$4.35 daily, quarrymen \$2.38, mechanics \$3.52, laborers \$2.11 and boys \$1.05. These wages are from 25 to 50 per cent higher than are paid in the principal granite States.

A remarkable fact is, that in the amount of capital invested in granite land, California is first, Maine being second, Georgia third and Massachusetts fourth. The total capital invested in the granite business in this State is \$2,829,794—largely in the value of the land.

Of the entire amount of granite quarried in

this State last year, \$419,816 worth was used for building purposes; 7,303,321 paving blocks were used—valued at \$297,236, or \$40.70 per 1000. Notwithstanding the higher wages paid here, the cost of producing these blocks was less than in any other State. Outlets of California the cost ranges from \$42.14 to \$78.67 per 1000. In Maine it is \$46.55, and in Massachusetts \$62.01.

For cemetery purposes the California quarries furnished material to the value of \$115,114. For bridge, dam and railroad work the value of the material quarried was \$237,475—this State standing easily first in this respect. In street work California is second, and in the value of the product for building purposes she is fourth. The highest figures for wages are in the Western States—\$2.11 in California and \$1.96 in Colorado.

The total number of cubic feet of granite produced in the census year in California was 4,761,411; total value of product, \$1,329,018; total wages, \$809,205; total expense, \$973,276; total capital, \$2,829,794; percentage of profit on capital, 12.57; percentage of profit on value of products, 26.77; cost of product per cubic foot, \$0.18; percentage of wages paid to total expense, 83.63; wages paid per cubic foot, \$0.15; percentage of wages to total value, 66.51; value per cubic foot, \$0.33.

There is no doubt but these statements will surprise many who did not know to what proportions the granite-quarrying business had grown in California. Great care was taken in collecting this data, most of the quarries having been personally visited by special agents. The value placed on some of the quarry land may be, and probably is high, for the reason that the area included was very large, while the value per acre may not have been excessive. California out a very small figure in this connection at the previous census, but this time she takes a stand beside States which have been granite-quarrying for a century or more.

Our Distinguished Guests.

California has done herself much credit by the cordial welcome extended to President Harrison and his party. Everywhere the most sincere enthusiasm has prevailed and exceptional marks of esteem and honor have been paid to the chief executive, in which those of every shade of political opinion and interest have eagerly participated. There have been tokens of welcome most unique in design and in spirit characteristic of the State and its citizens. The "California style" has dropped out and seems very agreeable to the recipients of our honors. No doubt the effect upon those high in the National affairs will be toward a truer appreciation of our Western spirit and the resources which we are developing, and this will be of inestimable value to us in many ways. Next week the President and his party will be in Oregon and Washington, and the northern part of the coast will continue the welcome which has been sounded on so high a key by the people of California.

President Harrison and his party have had dinners and receptions without number, but have found time to visit points of interest about the city, including the Cliff House, Park, Presidio and Fort Point.

Probably the most interesting trip for the President was that on the bay, on Tuesday. A fine steamship was provided for the President, and with him went the prominent officials of the State and city. The steamship was escorted by numerous Government vessels including the cruiser Charleston, revenue cutters Rosh and Corwin, the Hassler and the Madrona. Salutes were fired from the vessels and the forts.

A great fleet of excursion steamers, tugboats, yachts and other craft accompanied the President's vessel. The larger vessels went out through the Golden Gate, giving the President a chance to see that famous portal and its surroundings. He was enabled to examine the fortifications, and see the necessities of this post for further work in that direction. Officials with detailed knowledge of existing conditions were at his side to answer questions. After returning from outside, the fleet passed up through Raccoon straits, past the islands of the harbor, and proceeded to the Union Iron Works, where the launching of the Monterey took place, Mrs. Harrison pressing the electric button which released the vessel from the land.

The arrangements at the Union Iron Works were very perfect, and everything went off according to program. There were no accidents to mar the occasion, and the President was well pleased with the day's events.

He has since visited the Stanford University at Palo Alto, the cities of the Santa Clara valley, Monterey, Santa Cruz, etc., and visits Sacramento and Oakland on Saturday, leaving for Oregon and Washington on Sunday night.

Slag Cupolas.

Cuts on next page show the slag cupola used at the Lake Superior copper mines. The engravings first appeared in a paper by Prof. Eggleston in Copper Refining in the U. S., read before the American Institute of Mining Engineers and then in Mr. Peters' work on Modern Copper Smelting, from which we reproduce them. An elliptical furnace provided with sectional cast-iron jackets, forming a hosh 29 inches high immediately above the tuyere level, has been in use for many years for treating the slag resulting from the fusion of the Lake Superior Metallic "Mineral" in reverberatory furnaces, previous to the refining operations, which is merely a later stage of the same fusion.

The cupola referred to is a modification of McKenzies jog-iron cupola and has in place of distinct tuyere openings a five-eighths inch slot encircling the entire furnace and just below the water hosh. Below the tuyeres is a 34-inch deep crucible, nearly the full size of the furnace and closed by a drop-bottom protected by a few inches of sand. The water hosh consists of curved sections of cast iron fitted closely together and five-eighths of an inch on the inner and lower sides, while the external and superior sides have only half an inch of metal. This hosh is 22 inches high and is kept cool by a three-quarter inch supply pipe furnishing 25 gallons of water per minute.

The cupola is 7 feet 6 inches in height from tuyere level to charging door, and has a greater axis of seven feet and a smaller one of 4 feet 9 inches.

A peculiar inverted siphon arrangement for the lapping of the blast during the continuous slag flow will be noticed by reference to the illustrations. As even during the ten-hour campaigns made by these furnaces (owing to the small lots of slag belonging to separate mines) two of these slag flows are pretty thoroughly used up, they will hardly be likely to come into general use.

The material smelted is a siliceous slag from the reverberatory furnaces, carrying some 15 per cent of copper and over 40 per cent of silica. About 20 tons are smelted in ten hours, using anthracite as fuel, brief attempts to use coke having resulted in an increase in the richness of the final slag. About one pound of coal is used to smelt three pounds of slag, probably the highest consumption of fuel in the United States. Blast is furnished by a No. 5½ Baker blower, at a pressure of ten ounces per square inch. The metallic copper produced is impure, containing some five per cent of iron and half of one per cent of sulphur, the latter coming from the fuel; while the large amount of iron present is also due to the powerful reducing action of the anthracite, which seems necessary to decompose the silicate of copper present in the slag.

THE SMITH MINE.—Some weeks ago we mentioned the fact that the Smith mine of West Point, Calaveras county, had shipped some 1800 pounds of ore, which yielded from \$125 to \$141 per ton. The mine was owned by Tibbey & Porterfield, but since then Mr. Finck, of Will & Finck, has bought an interest. The shaft is down 110 feet, with the ledge widening. Two teams are hauling sulphurets to Valley Springs, from which place they are shipped to the Selby Works. The free ore is being piled up for future milling. Some fine specimens go \$200, but the run of the free-milling ore is about \$60. Three tons a day are taken out in sinking. Ten men are at work, but when the shaft is down 50 feet deeper six more men will be put on and they will begin to drift. Mr. Sales, of Mokelumne Hill, is superintendent and Robert Smith, of West Point, foreman of the mine.

A RUMOR has been published that the Anaconda copper mines, Montana, have been sold to the Rothschilds for \$25,000,000, but it is not confirmed by interested parties in this city.

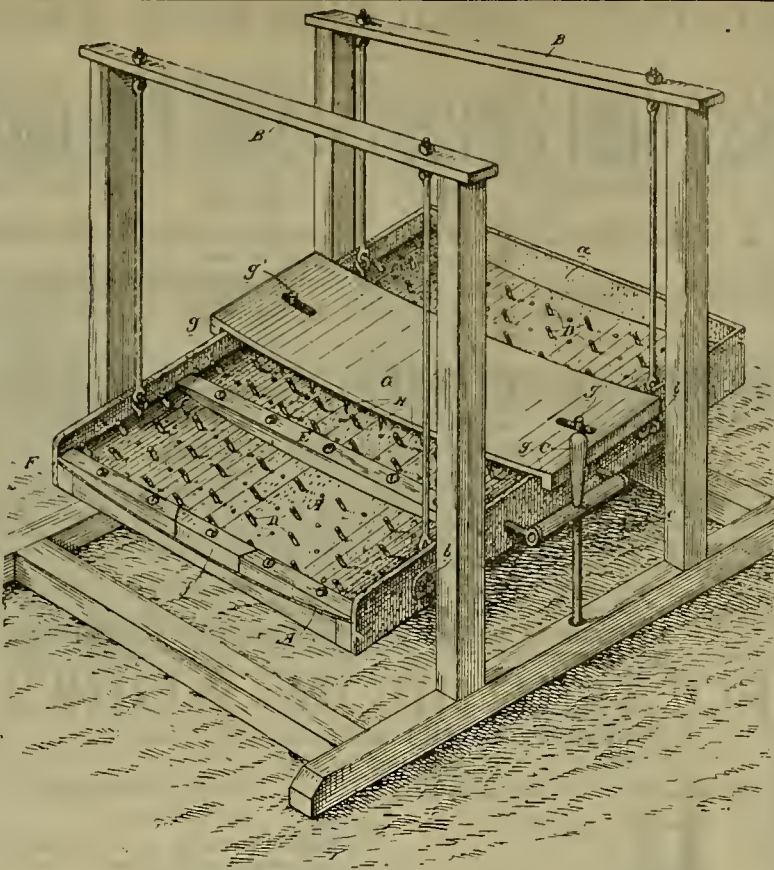
New Gold-Saving Apparatus.

George H. Bagley of Astoria, Oregon, has obtained a patent through the MINING AND SCIENTIFIC PRESS Patent Agency for an improved form of gold-saving apparatus, which is illustrated herewith.

A is the pan or table of the apparatus, which may be made of any suitable material, preferably of rubber, and provided with an inclosing flange, a. The table is made concave in the direction of its width, so that its middle throughout its entire length is lower than its sides; the table to be secured to a bottom framework. The table is suspended from arms, B, so that it may have a swinging, lateral movement, a jar being imparted, by means of the buffers, b. Motion may be imparted to the machine by any power desired. The surface of the table is dotted with numerous agitating pins, inclining with the flow of the material.

E is a cross riffle, the lower side conforming to the concavity of the table, and secured in a manner so as to be easily moved or its position changed as may be desired. F is a second riffle, similar in form to E, at lower end of table, with movable gate f in the center. G is a top agitator, shaped to conform with the surface of the table, and is held on the machine by cleats g, and is so connected and held in place by means of slots, as to move in conformity with the various movements of the table. H represents pins extending downward, so arranged as not to interfere with the pins on the main table.

The operation of the machine is about as follows: The material is fed upon the table at one end, and the machine being set in motion, the material is kept in constant agitation by the lateral motion and jar of the machine; the stuff working toward the riffle end f, the tendency being to gather the heavier and more



IMPROVED GOLD-SAVING APPARATUS.

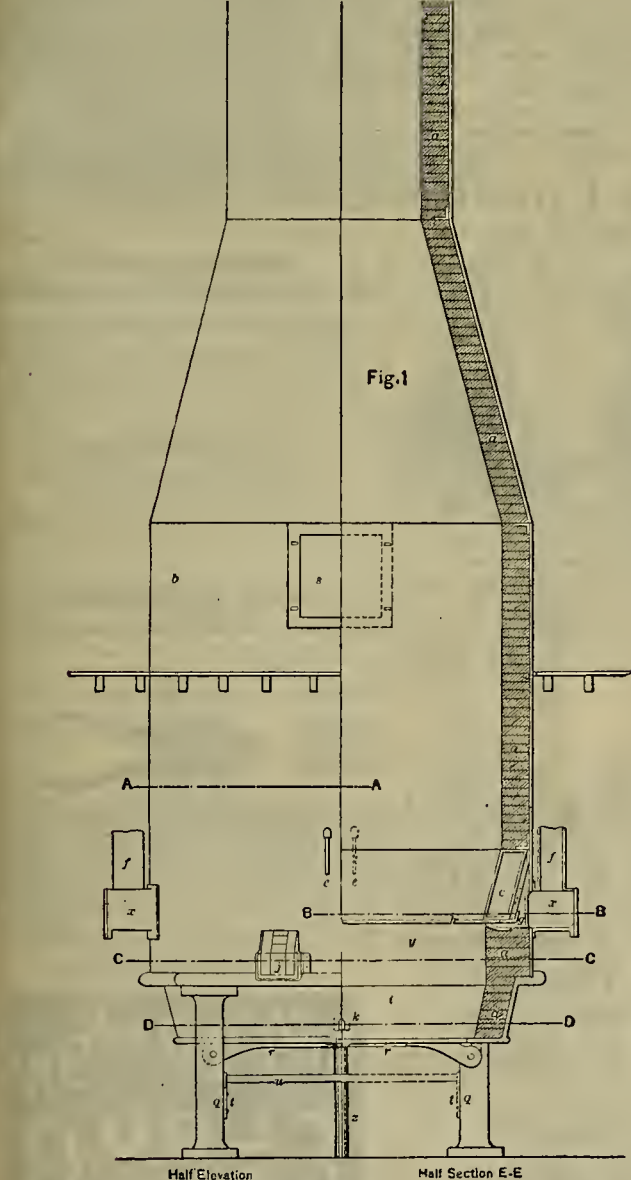
trates, under a less head of water, are allowed to make their way to the end, when the movable gate, already referred to, is removed, the concentrates and other material being easily swept from the machine, with the flow of water and the aid of a broom, into a sluice or concentration boxes, as may be desired.

It is quite apparent that this machine has an advantage that is sometimes overlooked in apparatus of a similar kind used in concentrating—that is, it can be cleaned up completely, whenever desired, thus presenting new and clean surfaces for new material.

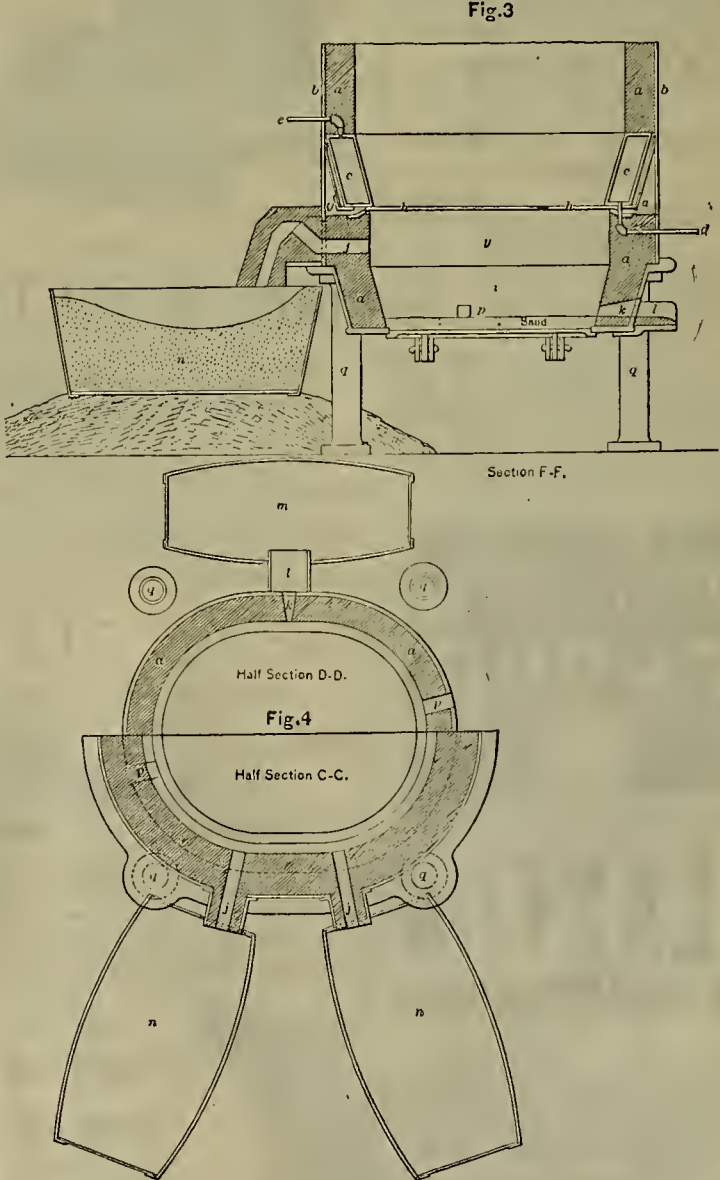
AT THE SALT FLATS in Alameda county they usually make about 60,000 tons of salt every year, which is worth about \$10 per ton. The salt product of California is solely by evaporation. Salt cannot be produced on the Atlantic shore as on the Alameda flats, because there is too much rain there throughout the year. And here we cannot compete very favorably with the English product, on account of the difference in the cost of labor and fuel. The English salt is brought over in ships, and there is an immense quantity now on hand.

THE expectation of a heavy wheat crop in California this year is attracting a large number of vessels from all parts of the world. It is expected that the promised high freights will bring so many coal-laden vessels into our bay that the supply will be greater than the demand—and that is why there is a prospect for very cheap foreign coals of all grades. The low prices may prevail throughout the year, unless strikes or other contingencies should interfere.

THE American Pharmaceutical Association Committee reported in favor of the metric system as a basis of weights and measures, and



ELEVATION OF SLAG OUPOLA FURNACE.



SLAG OUPOLA FOR COPPER.

precious particles in the depressed center of the centre riffle E, the lighter particles passing over it, to be again caught by the second or end riffle, when the lighter and poorer sands flow over into a waste sluice, meanwhile, the heavier concentrates being gathered and retained in the central portion of the machine.

For cleaning-up purposes the middle riffle is raised or removed, and the ends and concentrates

were authorized to present a memorial to Congress favoring its adoption.

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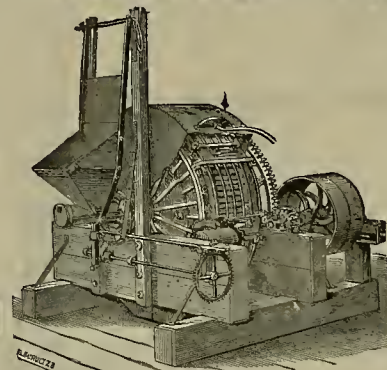
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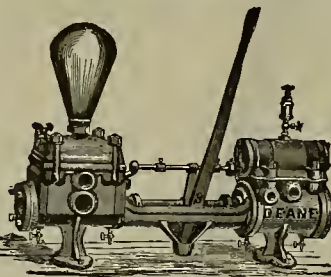
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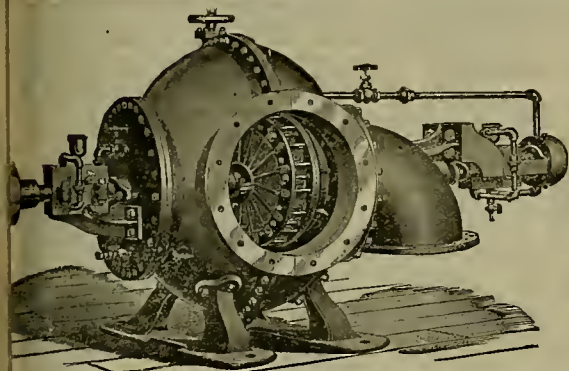
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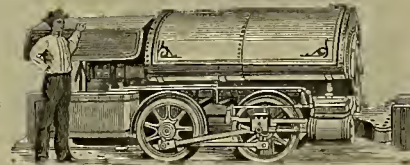
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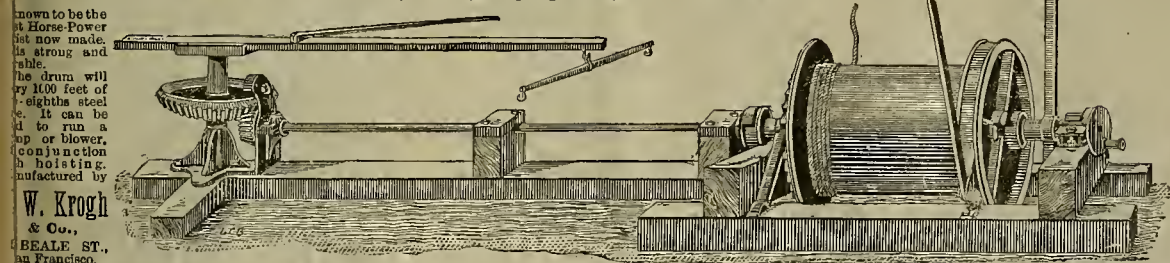
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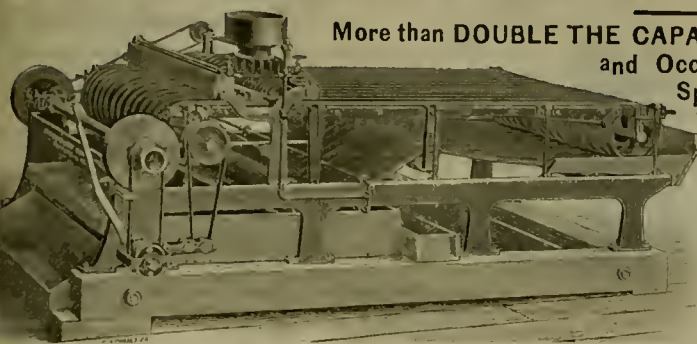
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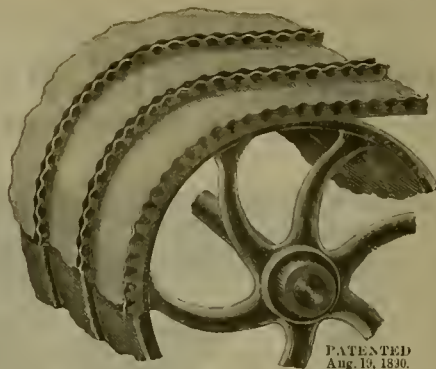
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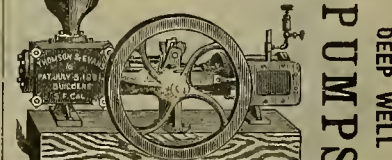
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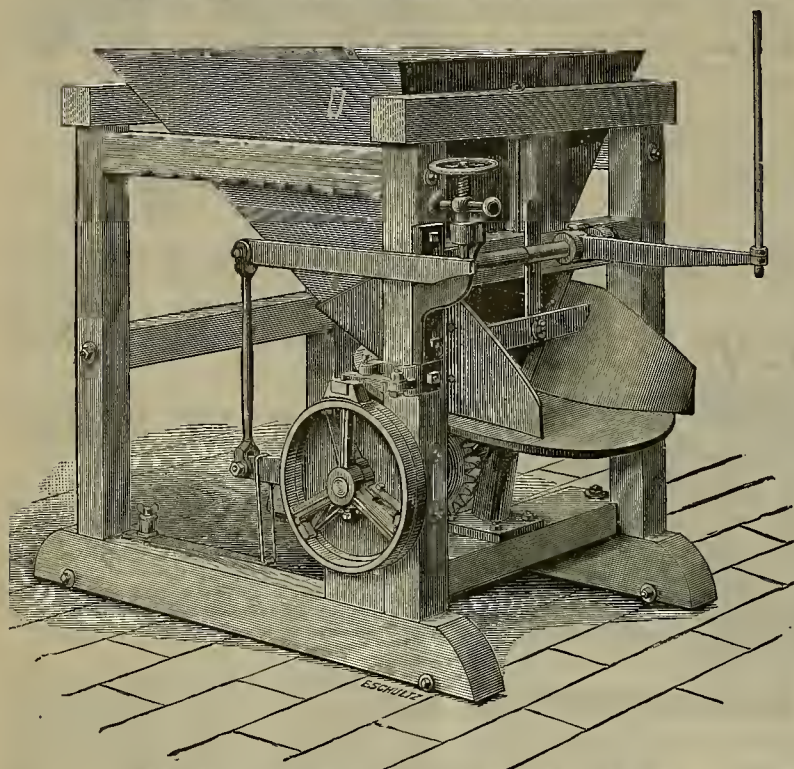


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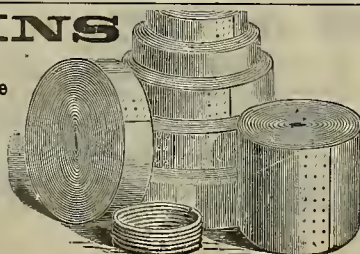
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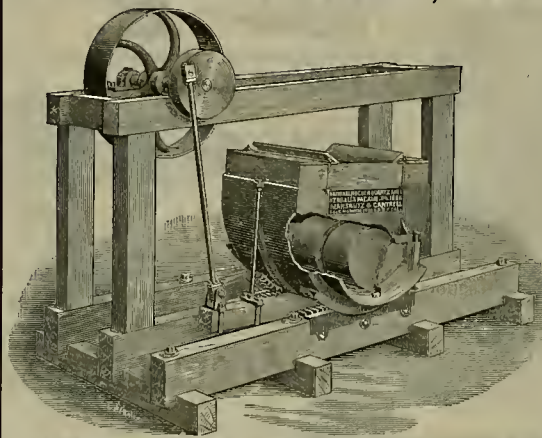
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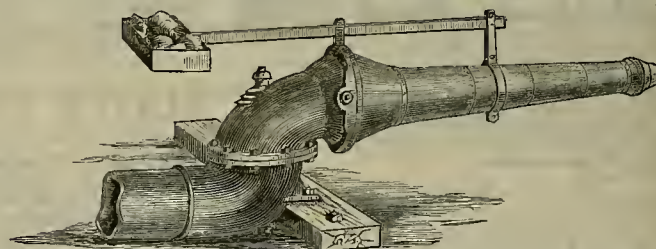
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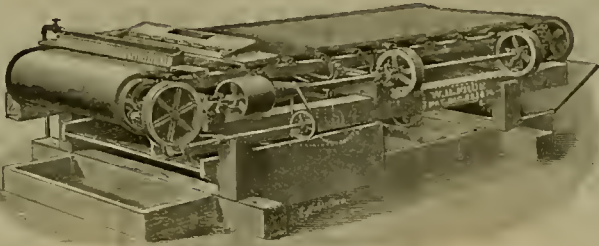
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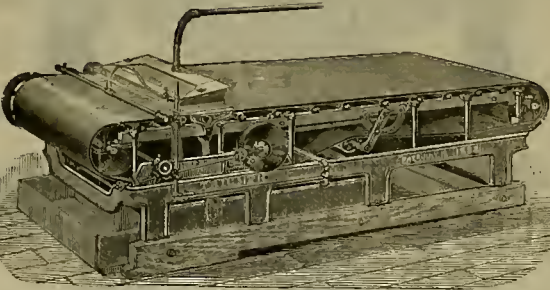
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Location of Works, Grass Valley, Nevada Co., Cal. }
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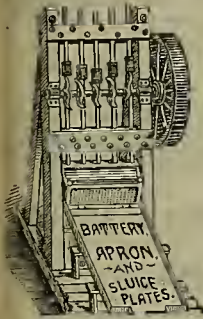
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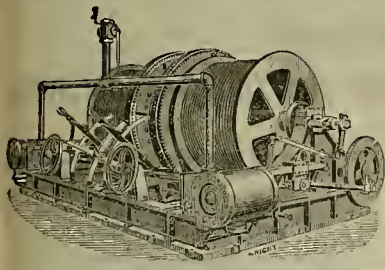
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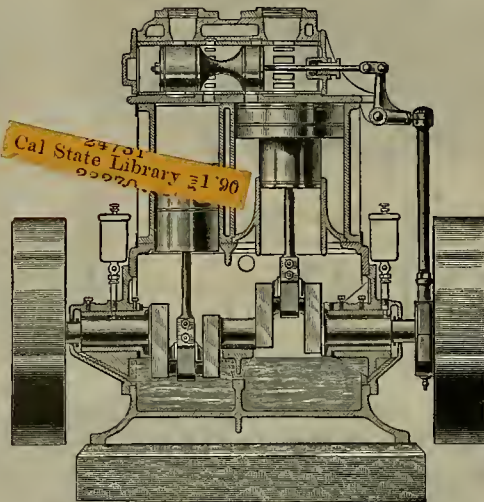
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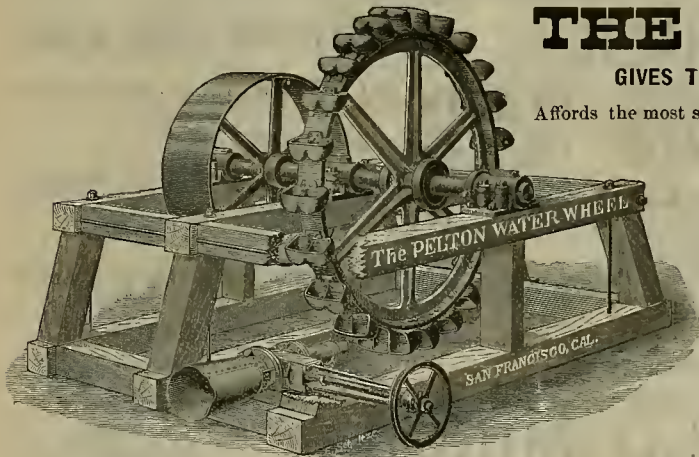
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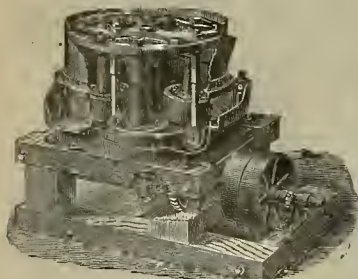
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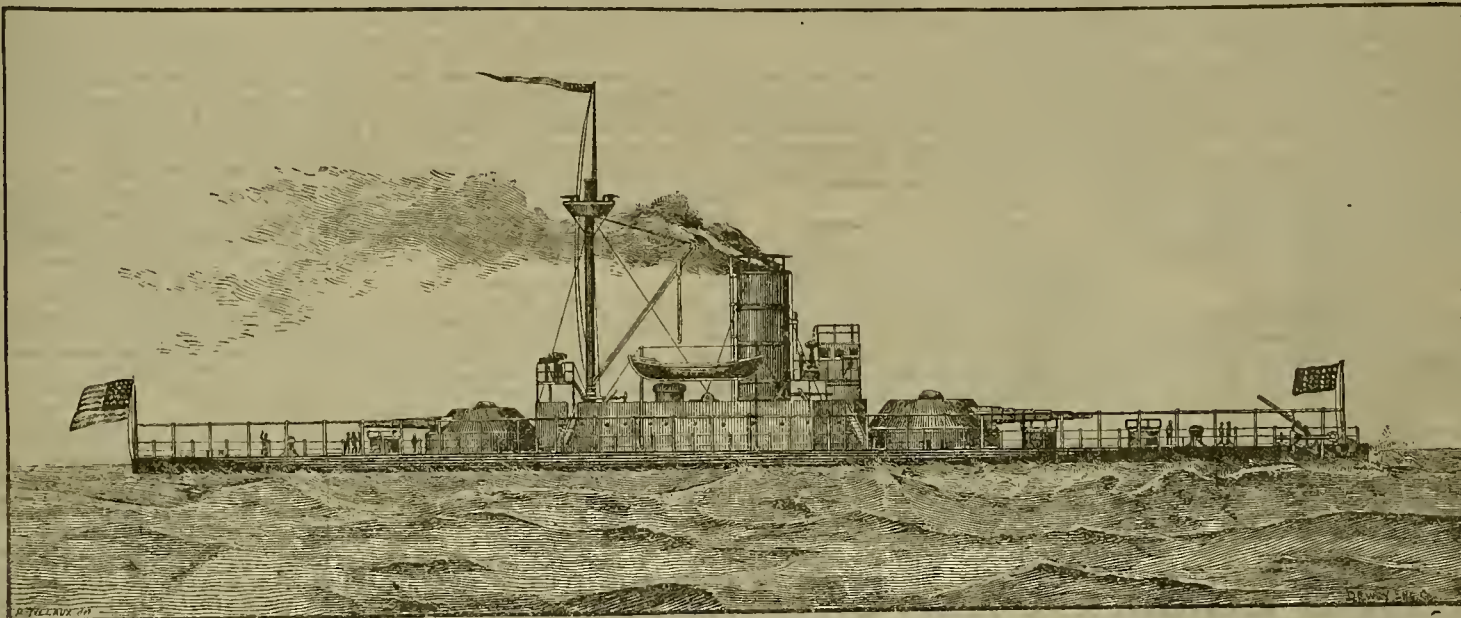
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SAN FRANCISCO, SATURDAY, MAY 9, 1891.

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THE NEW ARMORED COAST DEFENSE VESSEL MONTEREY.

The Cruiser Monterey.

Description of a New Floating Fort.

An engraving is given on this page of the new double-barreled, twin-screw, armored coast defense vessel Monterey, launched last week from the yard of the Union Iron Works, in the presence of President Harrison and party.

Mrs. Harrison touched the electric button which released the vessel from the ways. The Monterey is a two-sided vessel, as her picture shows, but she is powerful and strong, being well equipped for coast and harbor defense.

The contract for the construction of the vessel was awarded to the Union Iron Works June 4, 1889, and she makes the third man-of-

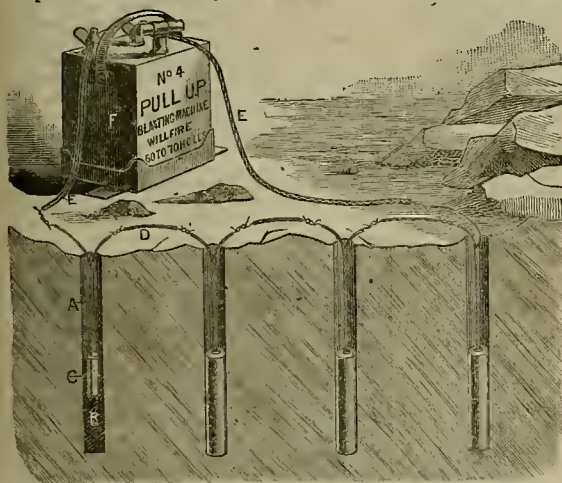
war of the new navy launched from the ways of that enterprising firm.

The general dimensions are as follows: Length over all, 261 feet; load water line, 256 feet; extreme breadth, 59 feet; mean draft, 14 feet 6 inches; displacement, 4000 tons; displacement in fighting time, 4486 tons; armor belt amidships, 13 inches thick; indicated horse power

of engines, 5400, estimated speed, 16 knots.

The Monterey is constructed entirely of steel and has a double bottom throughout, there being 110 water-tight compartments in her hull that can readily be filled with water, submerging the vessel until only about one foot of her sides shows above water.

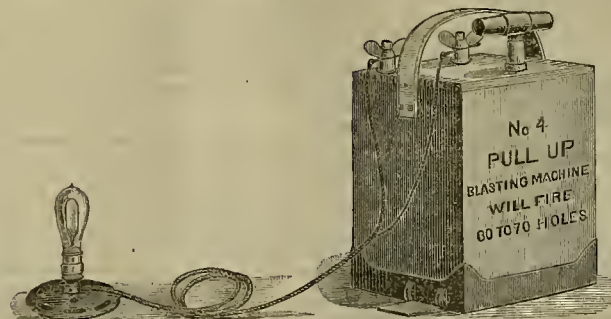
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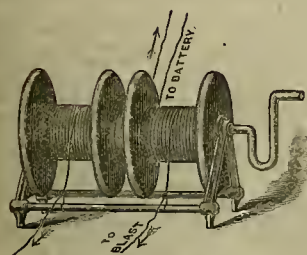
BLASTING HOLES CONNECTED IN SERIES.



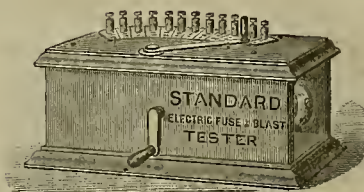
MAKING THE JOINT.



TESTING THE BATTERY.

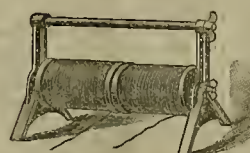


LEADING WIRE REEL

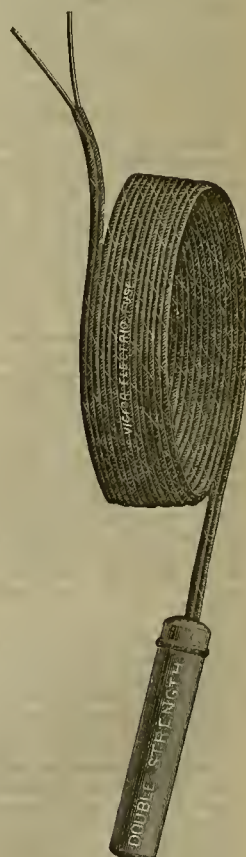


FUSE AND BLAST TESTER.

[SEE PAGE 296]



CONNECTING WIRE HOLDER.



VICTOR ELECTRIC FUSE.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EDS.

The Mines of Amador County.

[From Our Traveling Correspondent.]

EDITORS PRESS:—Amador makes no display, in fact is so very conservative that she does not receive the credit due her. To the old-time mining operators it is a well-known fact that the mines of Amador have produced a greater amount of gold than the same class of mines in any other county of the State. Amador not only has done this in the past, but the mines are still at it with a regularity and extent of dividends that challenge comparison. While the past and present are very satisfactory to all parties concerned, the near future promises to excel the past. Here, as everywhere, a new life has been infused into the mining industry, and instead of the old-time disposition to work only well-known mines of undoubted worth, a new era has been entered on and the old mines are being given a general searching for the hidden treasure, while numerous mines that had been superficially scratched over in times past are now either being developed or in a fair way to be.

This willingness on the part of mining capitalists to put money into a hole is due to the fact that a large amount of money not only has come but is to-day coming out of some of the "holes" in old Amador.

The county claims the distinction of having at this time a mine—the Kennedy—that pays the largest regular dividends of any gold mine in the State. That the Kennedy will equal, if not excel, the Old Keystone seems now a foregone conclusion, while other mines will soon follow her in the race for supremacy.

Plymouth.

At Plymouth, the Old Plymouth mine, under Mr. W. T. Jones as superintendent, has been undergoing a continuous system of exploration, with good ore in sight. From the 1245-foot level a drift has been run 1100 feet into the Indiana ground and a vein 15 inches wide of very good ore encountered. Twenty stamps of the old mill will be dropping on this ore, and should the vein widen to 30 feet, as it usually has done, it will only be a question of time until all 60 will be pounding away to show that the Old Plymouth still has an abundance of the yellow metal stored away for those who will persist and insist on finding it.

Bay State.

(W. T. Jones, promoter). This old mine is located in Enterprise district, three miles north of Plymouth. Its worth is so well known that Mr. Jones has succeeded in securing subscriptions to almost all of the stock from the citizens of Plymouth. In this way, without waiting for outside capital, the people of the town propose to develop and equip the old mine and reap the benefits themselves. If other mining counties would adopt the same plan, many a mine of known value would soon be declaring dividends, while the wildcat schemes in the same sections, that are heavily capitalized, drag out a lingering death, by continuous assessments, and finally close down.

New London.

E. Jones is superintendent of the New London. A drift is being run on the 1000-foot level, the mill, in the meanwhile, being closed down.

Amador City.

The Grover M. Co., J. Call superintendent, is opened by two shafts, 700 and 1000 feet deep. At this time the ore is coming from the third, sixth and seventh levels. The vein averages 15 feet in width of quartz that carries three per cent of \$90 to \$100 a ton sulphurets, while the ore averages \$5 a ton. The mine is equipped with a fine 20-stamp mill run by water power. In addition to the water power, the mine has a 50 H. P. Edison motor and dynamo for the pumping plant.

Bunker Hill.

J. Myers is superintendent of this company. They are putting down a new three-compartment shaft on the May Flower end of the property. The shaft is now down 200 feet, with a drain tunnel, 1100 feet long, run and connecting with it. Ore is taken out through this tunnel to the mill. In the old Bunker Hill workings, the mine is opened to a depth of 800 feet, with levels run 1400 feet, all in ore. The quartz carries 3½ per cent of sulphurets worth \$55 to \$60 a ton, while the average value of the vein matter is \$4 a ton. The vein runs from 10 to 12 feet in width. The mine has a 40 stamp mill and its own barrel-process chlorinating works.

The Keystone.

E. C. Hale, formerly on the Comstock, is superintendent. The Keystone is opened to a depth of 1200 feet vertically, or 1573 feet on the vein by two shafts. At this time 20 stamps are running on quartz coming from the upper levels, the work being in a manner of a prospecting character. In the lower workings, the quartz is not considered sufficiently high in value to work. The Keystone at 1573 feet has encountered the same barren ground that the Idaho struck at 1600 feet. In the Idaho it was only a question of going 300 feet deeper, through barren vein matter, until the mine got back to old-time values, and has remained there since.

From the large amount realized in the past

from the Keystone, it would seem that a few hundred feet more in depth would be not giving a good mine the development it has earned, and there is little, if any, doubt that the mine in depth will get back to her old habit of steady dividends. The Keystone is one of the oldest and best mines in the county, thoroughly equipped in every way. To date the mine has yielded \$3,379,992.49, and paid dividends of \$3,737,800.

South Spring Hill.

J. R. Tregloan is superintendent of the Spring Hill. The property is being given a general overhauling, not alone in the mill, but the mine as well. Its close proximity to the famous Keystone (which it adjoins on the south) coupled with the able management of its well-known superintendent, make it more than possible that this mine will tally the Keystone. The mine is now opened to a depth of 900 feet by two shafts, with drifts run 1500 feet on the vein all in pay ore. The vein averages 12 feet in width, though it is not unusual for it to swell to 50 feet. The ore carries one to two per cent of sulphurets that average \$90 a ton, while the vein keeps up in value with its width by giving its owners a steady product of \$10 a ton. The mine has a complete water or steam mill of 40 stamps, crushing 2½ tons a day to the stamp.

The works are lighted by the company's electric light plant. The company has recently added ten stamps to the mill, with additional concentrators, and purchased additional property, giving them 60 acres on the mother lode, 3000 feet on the vein, and 1300 feet on another, all from the earnings of the mine, which is now in condition to pay regular monthly dividends from this time on.

Amador Reduction Works.

Voorhes & Barney are the proprietors of these works, which are midway between Sutter creek and Amador City. The main works form an extensive chlorination plant, probably the largest and best equipped of any chlorination works on the coast. At this place, four tons of sulphurets are treated each day at a charge of \$20 a ton, less 10 per cent, on low-grade sulphurets, for loss. The Amador Works received the personal charge of Senator Voorhes. In addition to this plant, the owners also own the Phoenix Reduction Works at Drytown. The Phoenix is in charge of Mr. Barney. While these works are not as extensive as those of the Amador, still they handle three tons of sulphurets a day, and work them as close as the Amador. In addition to these works, the Zeile, Kennedy and Bunker Hill mines have each their own chlorination works.

Knight's Iron Works

Are located at Sutter creek. These works furnish the larger part of the machinery for the mines of Amador county. They could not do so, if the work turned out was not the equal of any other works. In the near future, Mr. Knight will take his light from under the present bushel, and illuminate the advertising column of the PRESS with the same.

Sutter Creek.

The Old Mahoney is now incorporated as the Hector G. M. Co., with S. D. Valentine as superintendent. Mr. Valentine is giving the Old Mahoney an awakening, and with time will put her on the list of dividend mines of Amador; 5000 feet of 15-inch pipe is now being put in to connect the mine with the Amador canal, and change the works to water-power, and new hoist is being put up to develop the mine. In the meanwhile, 40 stamps will be started up on surface rock. The old shaft is 1000 feet deep. There has never been any question as to the mine's value, and now that it has fallen into the hands of the Valentine Bros., there is no doubt of their making a success of it.

The Lincoln.

The Lincoln (S. Moyle, Supt.) is now being operated by the administrators of the Stewart estate, who are confining themselves to the surface ore, which averages \$2.50 a ton; 20 stamps are dropping. It is the opinion of the mining superintendents of the company, that this property only wants capital and competency to make a mine of it.

The Summit.

J. Tregloan & Son are owners of this property. It joins the famous Enreka on the south. The vein crops 50 feet wide in ore that has gone from \$18 to \$35 a ton. Messrs. Tregloan intend to incorporate the mine. With the success that has been the lot of father and son in the Spring Hill and Wildman, there is no doubt of their making a success of the Summit.

The Wildman.

On the Wildman, Mr. John Tregloan, the superintendent, has shown what can be done with an abandoned, worked-out (?) mine. He now has the shaft down 800 feet with drifts run 400 ft. on the vein, which runs from one to 50 ft. in width, carries from 1½ to 2 per cent of sulphurets that run from \$65 to \$120 a ton; while the ore averages \$6.25 a ton. The mine is equipped with a fine 30-stamp mill, crushing 65 tons a day. The mill and works are lighted by the mine's electric light plant. Mr. Tregloan has brought his long experience in mining to bear upon the property as is shown by the numerous appliances for the rapid, economical and effective working of the ore. While the company has expended over \$40,000 in the equipment of the mine, this and a dividend of \$12,500 has been paid back out of the proceeds of the mine in the short time that Mr. T. has

had it in operation. If further proof were needed of the mine's success, a handsome retort of gold that kicked the beam well up in the thousands was on the scales at the time of my visit.

The Kennedy

Is to-day the leading mine of the county—paying very large monthly dividends, in fact the largest of any mine in the State. The superintendent, Mr. J. T. Parks, is one of those conservative men, who, while exceedingly kind and unmanly courteous, prefers in his modesty, to say nothing of himself or the mine under him. It is but due the mining public to say that Mr. Parks is regarded by the mining superintendents of the county, as the best mine superintendent in the county and these same superintendents insist that the fact that the Kennedy's last monthly dividend was for \$40,000 should be known, so we give it and beg pardon of Mr. Parks for so doing. The Kennedy is opened by two shafts, the north, 1350 feet and the south 1250 feet deep. The vein has been drifted on for a distance of 1600 feet, with an average width of four feet. In the pay chutes the vein very accommodatingly swells to 20 feet in No. 1, to 10 feet in No. 2 and three to four feet, in the other two shoots. The ore carries 1½ per cent of sulphurets of \$100 to \$175 a ton value, while the vein matter runs from \$12 to \$15 a ton. The mine has a complete 40-stamp mill, and three tons a day chlorinating works. With dividends of \$40,000 a month, it does not require a prophet to foretell that the Kennedy is going to press the old Keystone very hard in the millions.

It is not anatomy for me to say aught personally of the superintendents of the mines, but in Mr. Park's case, I would like to digress and state that he is not alone an experienced mining superintendent, but a gentleman in the truest sense of the word.

The Zeile.

The Zeile is down 1160 feet, with drifts run 940 feet on the vein, which has an average width of 30 feet of quartz that carries 2½ per cent of sulphurets averaging \$100 to the ton, while the vein matter averages a little less than \$4 a ton. This, under Mr. W. T. Detert's management, is mined and milled for \$3 a ton. The mine has a 40 stamp mill, crushing 140 tons a day, and a chlorination plant of three tons a day capacity. The hoist is run by steam and the mill by water power.

The Amador G. M. Co., Limited, property, pending litigation, is closed down.

Irish Town.

On the Climax, Reed & Huskey owners, a tunnel is being run 450 feet to the vein. While this tunnel is being driven the 10-stamp mill is idle. The Climax is well known for very rich specimen rock.

Clinton Con. M. Co.

This company is working the Clinton and McCardo with two mills of 10 and 20 stamps. The mine is opened by a tunnel 1000 feet long that cuts the vein 200 feet deep. The vein is very large, running up to 25 feet, and carries a large per cent of sulphurets that go from \$150 a ton up, with the vein matter running from \$5 to \$50 a ton. The mines are under the charge of Mr. John B. Francis and Wm. Floyd. While but little is heard of this section, notwithstanding the fact that the Clintons are dividend mines, the coming season promises to show up a number of good properties in addition to those already developed. Amador has done well in the past. She is doing well in the present, with every evidence of doing still better in the future.

The mines are almost all of them on the mother lode, and in a section where the vein matter of the lode averages higher than in any other county, thus assuring permanency, size and value to her quartz veins, from which naturally follows the large dividends for which Amador county's mines are famous.

E. H. SCHAEFFLE.

A Gold Bismuth Ore in Arizona.

EDITORS PRESS:—Under the caption of "a peculiar occurrence of gold" you quote in your issue of April 11, an interesting article from the *Engineering and Mining Journal*, written by Mr. C. H. Aaron. In it a description is given of certain small mineral veins in Honduras, which carry gold and bismuth. I send you a sample of ore from one of my discoveries in the Doa Cabezas Mountains, in southeastern Arizona which you will find rich in both of these metals. It comes from a very large vein, but occurs only in spots in the common ore, which contains a good deal of talc and magnetic iron.

To save the gold in assaying this ore requires great care. There must be a free use of litharge and lead, and if the muffle gets too hot, the "button" will suddenly disappear, leaving only hundreds of almost invisible globules of metal on the top of the anvil. Many noted assayers have certified that ore of this class which I sent there for assay contained only "a trace of gold," or they gave a dollar or two per ton as the accurate product. Since I could get sufficient free gold in the horn-spoon to prove that the very one they had treated contained \$40 to \$50 to the ton, I ceased to put confidence in such certificates.

When I made one or two shipments of selected ore to well-known smelting works, and was paid for them under assays varying from \$187 to \$237 per ton, with scarcely any silver, I con-

cluded that my horn-spoon tests were more trustworthy than the assays I had been getting.

The assayers at the reduction works where the ore was sent, being warned as to the care necessary in assaying it, appeared to get along very well. There is visible gold in the fragment of ore I mail, and, if properly assayed, it will be found of high grade.

Perhaps Mr. Aaron's allusion to "the well-known expansion of bismuth at the moment of solidification after fusion" may explain to some extent why under certain conditions the gold in assays made of this ore vanishes from the anvil. The cooling of the bismuth in the bone ash may produce sufficient expansive force to throw the "button" in a thousand directions. If that should be the case, then the overheating of the muffle may not be so fatal to an accurate return, as the leaving of the button too long in the cupel would prove to be.

JOHN DARE EMERLEY.

Dos Cabezas, Arizona, April 23, 1891.

Placers of Sonora, Mexico.

NUMBER IV.

EDITORS PRESS:—Since my last communication, I have learned that certain parties in this city claim all right and title to the placers of Los Llanos and La Cienega, State of Sonora, Mexico. As I have already stated that the titles obtained by Samuel and Charles M. Tyler from the State of Sonora for the above districts were not considered good and sufficient, an explanation may be necessary and save considerable time and expense to others, who may have any idea or intention of holding the above grounds in fee simple.

I have before me two maps, made of the two placers, drawn from the field notes of surveys, and made for us by the Perita de Minería, who is a federal officer or surveyor, appointed by the Government to inspect, measure and deliver vein and placer claims to the parties denouncing them.

These surveys were made at our request and with all the formalities required by Mexican mining laws. Now, although the documents are on stamped paper (which, by the way, is required on all documents made in that country, to render them legal), the grounds formally delivered to us, under the endorsement of the Governor and Secretary of State, I still consider the title worthless. They require the approval of the Federal Government of Mexico, the same as our laws require a Federal patent on mines, to hold them free from denouncement, when idle or not worked within specified times. Yet they can be worked in the manner I have stated, by working out one claim and taking up another, or by a number taking up claims so as to have ground enough for formal operations.

As the State title we held was for about 56 square miles in the Cienega district, and about 42 square miles in the Llanos, it looked at the time like a very good thing, and might even yet lead an honest miner into an operation or an enterprise, that would prove a "delusion and a snare;" I of course allude to the title.

In any event, the extent of placer ground is majestic and grand; for, if we take their area to be 60 square miles, something over one-half of what was granted, it can be demonstrated that it would take nearly one-half a century for 100 machines of the capacity of 600 tons per day to exhaust the ground. This is allowing 26 days per month and the dirt to be five yards deep.

Again, it can be demonstrated, as I have already stated in a previous article, that there were one hundred millions remaining in the two placers. I should like to say that one hundred and sixty millions would not cover the amount in the two districts. Of course, all this is theoretical, and yet it is a long way from the impossible.

In presenting the following traditional and legendary lore of Los Llanos and La Cienega and which is the common talk of Northwestern Sonora, I do so with the idea that the tales are fully as reliable as the stories of the millions sunk with the steamer Brother Jonathan on our northern coast, the wrecks of the Galleons in Vigo bay, on the coast of Spain, with their millions, and many other accounts that are yet to be proven.

During our stay among the placers another subject took up our attention, and while but little fact and a great deal of fancy and romance were established, it was and is still an interesting study.

What the deuce had become of all the gold taken out?

It is related that Don Teodoro Salazar, the discoverer, made his headquarters in about the middle of Cienega, where he put up an immense building for himself, including buildings for storehouses, and a hacienda for working the rich quartz croppings of La Mina de Salazar and La Mina Teodoro.

Salazar, it seems, was a stately Spaniard, without relatives in Mexico, rich in cattle and lands, and with all that contempt for races not white, so characteristic of the Spaniards, who is said to have taken a cool, calculating advantage of the miners in every way. Having hundreds of employes of his own, Mexicans and Yaquis, and immense stores of dry goods and provisions which he retailed at prices ruinous to purchasers, and to all who came in his way, his

commercial transactions must have produced fabulous returns.

This together with his being right in the beginning and middle of the bonanza of both placers, the absolute way he had among all classes, the hundreds of servile peons of his own, whose earnings were daily poured into his coffers, gave the impression that his wealth in gold alone, reached well up in the millions.

About 1820, having reached well into the allotted span of man, he sent for the priest of the church of Cienega for confession and absolution, exacting a promise that in regard to his wealth, nothing should be said before his death.

The priest's story, told after the demise of the old Spaniard, was that when the services of the church for the remission of sins had been performed, he, in a sociable and friendly way, asked the old man in regard to his great wealth, and whether he might antedate some hope that his church would not be forgotten in the way of a donation. That in reply the old man assured him that the church should not be forgotten, and then leading him through several rooms to one located near the center of the building, he, with some effort, unbarred and unlocked a great door, disclosing a room completely in the dark. Producing a light, he opened great chests, at least ten in number, which were absolutely stuffed with gold, both in sacks and loose, both fine and coarse, some of the lumps the size of goose eggs and down to hokory nuts, beans, corn and lentils, down to bags of dust. Returning, Don Teodoro presented the good father with ample means to thoroughly renovate and redecorate the church. Since that one interview, he never was invited to the house again, nor allowed in any way to ever open up the subject with the old Spaniard, who, so the story goes, died about two years afterward.

It was not long after this latter event, when it can readily be imagined, that an industrious and persistent search was made for all this hidden wealth, but without success. Not one trace of the old Spaniards hoarded millions has been met with from that day to this. Every cave and nook for miles around Cienega has been prospected and overhauled, the ruins of the old building dug up and every rumor traced.

Then superstition was resorted to, or came naturally, particularly among the class of which I am writing, and it was asserted that the shade of the departed Don was seen to be walking among the ruins of his buildings. His stately walk, his black, brocade suit and silk hat, all appearing as in life, and that his walks generally took place on moonlight nights. However, this latter notion was effectually squelched by Salvador, a Papago, and one of our workmen who, brave as a lion and lithe as a leopard and with love of gold fully developed, frequently took his serape, tobacco and machete, and amid the lonesome ruins, "camped on the trail" of the old Spaniard, and of course without meeting him. (This is an actual fact; Salvador in describing the idea to me, stated in fair Castilian, that it would take a much warmer place than Cienega to stop him from learning something of the treasure if he once got his eyes on the "spook.")

Personally, I felt considerable disappointment when I found that the little lake in the town had been cleaned out to free it from the grass and weeds encroaching upon its surface. I should have readily joined in pumping it out, as the gold fever is quite contagious.

Knowing the faithfulness of the poor despoiled peon, it is my opinion that with the assistance of some trusted ones, Don Teodoro packed the gold away, and buried it at some considerable distance from Cienega, and probably, which is a horrible thought, the poor peons never returned to tell the tale.

At the Llanos, at the local placer named on the map La Barraca, the sands are very deep (said to be 50 feet to bedrock), and which are of a flowing nature; we were told of an accident to the miners in the early days, that has kept them from attempting to reach bottom ever since. It is told that in the early periods the surface grounds of the Barraca were quite rich and an attempt was made to reach bedrock. In their primitive way, the miners designed quite a large surface opening, which was to taper gradually in the shape of an inverted cone while sinking, with a view to stop the running sand. Bottom was finally reached, and a few yards of it exposed, showing, so the story runs, a bedrock literally covered with gold nuggets. The excitement was so great that a rush was made from the adjoining claims, when the sand started to run, leaving four miners buried on the bottom.

Now, while we had every confidence in our ability to bottom the claim, with a orbed sinking shaft, such as we built at Cienega, the story was too rich, and with the many other affairs we had on hand, we could only look at it theoretically, and leave to future explorers its accomplishment.

At La Plateida, marked on the map of Cienega, we were shown ground where it was said to have been so rich that a great many were killed in the fight made to dispossess the more fortunate ones of their claims.

Of Celis Island, just off the eastern coast of the Gulf of California, lying but a few miles from shore, near the port of Libertad, some very strong stories are told of the gold and silver to be found there, the placers being hardly touched. The Celis Indians, who are the sole owners and inhabitants, and about 500 in number, are a savage, warlike race, and will not permit any interference in their

affairs—so much so that Mexico has not been able to get them under control. As I saw about 30 of the Indians give an exhibition of their ferocity and warlike ability while on their way to treat with the Governor of Sonora on some local differences in regard to the management of their fisheries, it was a natural conclusion on my part to let some one else take their island.

These stories might be continued for pages and are only given that the wheat may be separated from the chaff; yet they form a part of the accounts already given, and in a way, show the favorable estimate the natives have of the placers I have already described. At the same time many stories, tales and traditions have led to prospecting and researches that in a number of cases have turned out grandly, as witness some of the mining ventures in California, Nevada, Arizona, etc.

The placers, in my opinion, are quite good enough as they are for economical handling with capital, and should any of the many rich stories about them prove true, they would simply add to their value as already known to-day.

CHARLES MARION TYLER, M. & M. E.

Terrorite.

A New High Explosive.

Terrorite is a high explosive which is claimed to be more powerful than high-grade dynamite and safer to handle than gunpowder. It is applicable to all purposes where a high explosive is desirable, such as destructive blasting, shooting, oil wells, etc., and its safety in handling makes it especially valuable for use in warfare and for engineering purposes. A Russian Company, with headquarters in this city, is corresponding with the naval authorities at Washington for permission to experiment with Government guns. They are also trying to arrange with one of the San Francisco powder companies, not now manufacturing, for the use of their plant for making this new explosive.

The use of terrorite does not require any change either in the guns themselves, the projectiles or the fuses. The shells may be filled with the explosive and the apertures closed with wooden plugs, or the fuses can be screwed in at once and the shells kept in storage.

The Mexican Consul in this city called the attention of his Government to this new explosive, and at President Diaz' invitation the chemist sent from here and manufactured a quantity of the powder for experimental purposes. By order of the Minister of War, a Board was convened to test the powder.

The shells used in the experiments were ordinary ones, such as would be utilized with powder charges, and were fitted with American and French fuses.

Before the Mexicans ventured to load the cannon with shells filled with Terrorite, the shells were subjected to the following test in order to determine their insensibility to shock: Three shells, eight centimeters diameter, each containing 180 cubic centimeters of the explosive, were closed with wooden plugs, and thrown from a height of 50 meters, then from an elevation of 82 meters, striking the stony bed of a river. None of them exploded.

Then six shells with concussion fuses were fired from a muzzle-loading howitzer, and nine shells were fired from a French breech-loading steel gun. Three shells fired from the gun were without fuses and burrowed into the ground, without exploding and uninjured. The other six shells smashed against the various targets of wood, earthwork, granite and cast and wrought iron, demolishing them into small fragments. The new explosive is smokeless and has been adopted by the Mexican Government. The tests and experiments extended over several months, and only after all the advantages were fully demonstrated did the Government acquire from the inventor the right to manufacture and use the explosive.

The qualities of terrorite are thus stated by those interested in its manufacture in this city:

1. Its explosive force can be regulated at will. In its most powerful form it is four to six times as powerful as ordinary commercial dynamite.
2. It is not affected by shock, jarring, jolting or other mechanical influence.
3. When exploded it is smokeless.
4. It does not explode by the direct application of fire, but burns steadily until the heat developed exceeds 260 or 280 C.
5. It remains chemically stable, and does not lose any of its properties by prolonged storage.
6. It can be made of any consistency desired, from the semi-fluid to the plastic, like clay.
7. It does not disintegrate in contact with iron, copper, brass, zinc, tin or lead.
8. Frequent changes of temperature, even below the freezing point, do not affect its explosive force.
9. It is especially valuable for use in artillery, as it can be fired with a powder charge, while the containing shell is shattered into small fragments. The fragments of the shell are hurled with terrific force in all directions, and cover an area several times greater than that effected by the explosion of an ordinary powder-filled shell. Furthermore, as the fragments of the shell are small, the effect in the

enemy's ranks must be proportionately more destructive.

10. It may be used for loading all kinds of shells, and no change in the guns, their loading mechanism, the shells, or fuses is required.

11. By its great explosive power, its safety in handling and its chemical stability, this explosive is eminently adapted for charging torpedoes and all kinds of submarine mines, either stationary or movable.

12. In naval warfare, this explosive stands unrivalled. A shell filled with it can be made to penetrate the armor of an iron-clad before explosion, and even if the penetration is only a few inches, the explosion will cause enormous damage.

Prof. Lemmon's Report on California Conifers.

The botanical portion of the 1890 report of the California State Board of Forestry is commented upon by *Garden and Forest* as follows:

An account of the true Pines of California appeared in the Second Report of the Board of Forestry of that State from the pen of the botanist of the board, Mr. J. G. Lemmon, who now supplements this with a paper on the other coniferous trees of the Pacific forest, which occupies the larger part of this third report and which is enriched with many admirable illustrations made from photographs of trees, forest-scenes, and fruiting branches of many of the species. In this paper, after some remarks upon conifers in general, their history and distribution, Mr. Lemmon describes their classification, and then proceeds to give an account of the different species (exclusive of the Pines) found in California, and in the regions of which California must be considered, from the botanical point of view, an integral part, that is, all the great territory of western America which extends north and west of the State. An account of the different species is preceded by notes on the genera to which they belong, and to this is added some information relating to species which occur entirely beyond the region. In the case of the Hemlock, for example, there is a short account of our eastern species, and of the Asiatic species of this genus; and under the Spruce, not only are the Pacific coast species described, but the White and Black Spruces of the east as well, the European Spruce, and some of the Japanese species. Changes in the generic and specific rank of a few trees are proposed. The Alpine Hemlock is here removed from Tsuga and made to compose the genus *Heopropence* (Engelmann's sectional name), a genus characterized by Mr. Lemmon by its alpine habitat, its cones, which are longer than those of any Hemlock Spruce, oblong-cylindrical, and two to three inches long, with numerous scales, nearly all of the same size, and reflexed at maturity, broader than long, four to eight lines wide, and striate with a thin, wavy, rounded border; by the small, spatulate bracts three to four lines long, by the angular seeds with resin vesicles, and elliptical wings three to six lines long, and linear scattered quadrangular leaves keeled above and below with a solitary and large resin duct. "The propriety," he says, in speaking of this tree, "if not the scientific necessity, of separating it from Tsuga may be justified upon the ground that the conifer family is so large, and the necessity for dividing it into groups for convenience of comparison is so apparent, that comparatively slight differences (so they are fundamental) must be taken for generic distinctions"—a view of genera in which, we fancy, all students of conifers will hardly concur.

The large-cone Douglas fir of the mountains of Southern California, which Engelmann considered a variety of the widely distributed *Pseudotsuga taxifolia*, is now restored to specific rank under the name of *Pseudotsuga macrocarpa*, because the author recognizes "in it elements that certainly point to such separation. It must be borne in mind," he remarks, "that the evidence of distinctness does not depend so much upon the number of characters as upon their permanence. Now the characters of this spruce are always uniform—no transition trees connect it to the other species; again, the other species is both north and south of it, particularly north. If this big-cone development is a recent variation, what has produced it? If a southern climate, why are not the Arizona and Mexican trees still larger coned? If a dwarf variety, why so prolific in fruit?" Mr. Lemmon, in a note, calls attention to the fact that when he visited the headquarters of this tree, in the San Bernardino mountains in 1876, "the cones of the preceding year's crop lay on the ground so abundantly that they were two or three feet deep under the trees—a degree of fecundity never observed in the taxifolia species."

The red fir of the Sierras (*Abies magnifica*) is well described, and the variety of Northern California, which so long puzzled botanists by its long, exerted cone-bracts, resembling those of *Abies nobilis* of Oregon, is described as the variety *Shastensis*. The peculiarity of this variety of fir, aside from its locality, is connected entirely with the fact of its cone-bracts becoming long and protruded, a half to a full inch between the scales, rendering the large purple cones, thus decked out with tasseled fringes, a most beautiful object. The trees of this variety, Mr. Lemmon tells us, are "very large and lofty, though not so immense and high-headed as in the typical southern form, but they become, on the southern slopes of Shasta,

a dark, gloomy assemblage of massive black trunks, colored on the north side, from base to the limbs, with bright yellow lichens or tree moss; the lower limbs draped here and there with long sweeping festoons of black, filmy lichen, giving a inneral aspect to the whole scene, scarce relieved by the twitter of a red squirrel, the long, wailing note of a woodpecker, or the occasional cry of a bald eagle."

A second variety of this species is distinguished as variety *xanthocarpa*—"a smaller, less symmetrical tree than the typical, with smaller cones averaging four to five inches long, half as thick near the base, tapering slightly to the apex, and of a yellowish color." It is found in the high Sierras around Meadow Lake, Sierra county, where, Mr. Lemmon tells us, it forms the greater part of the noble forest of that region.

Mr. Lemmon considers the white fir of the Sierras and of the mountains of Southern Oregon simply a somewhat modified form of *Abies grandis* of the Northwest coast "distinguished by having a rather rigid habit, the branches relatively shorter and stouter than those of *Abies grandis*. The young shoots are olive-green, the buds ovoid, the leaves dark-green above, whitened with stomata below (also with a few rows above), the leaves relatively very long—one and a half to two inches—nearly all of the same length, obtuse at the apex, not usually two-ranked except on lower branches, yet all are twisted half around at the base, which allows the light to reach through to the branchlets past the distorted leaves. It is, in fact, midway both in locality and in characters between the green-leaved and green cylindrical-coned *grandis* of the moist northern forests and the white-leaved and light-green elliptical-coned *concolor* of the southern arid interior regions." It is this tree which is called *Abies Lowiana* in English plantations, and which, from a horticultural point of view, is very distinct from the species of the Northwest coast, although hardly distinguishable from the long-leaved form of the Rocky mountains.

It is not quite clear whether our author intends to consider the California Sierra tree one variety and the Colorado tree a second variety or not. He adopts for the California tree the name of *Abies grandis*, variety *Lowiana*. If he considers it distinct from the *Abies concolor* of Colorado, he seems to be the correct name; but if he holds that there is really but one mountain form of *A. grandis* worthy of a distinct name, then this should be known as variety *concolor*, it having been named *Abies concolor* before the name of *Abies Lowiana* was bestowed upon it.

Mr. Lemmon, in his very full and interesting description of the Big Trees, raises an interesting point as to the origin of the name Sequoia. The name was made by the Austrian botanist Endlicher, who published the genus in 1847, but, unfortunately, did not give the etymology of this name. It has been generally supposed that it was formed from the name of the half-breed Cherokee Indian, Sequoyah, a man distinguished in having invented a syllabic alphabet for his tribe. Gordon, however, in the second edition of his "Pinetum," published in 1875, states that the name was probably formed from "sequence, separated or following in order of succession after Taxodium, from which Prof. Endlicher separated it." Mr. Lemmon now says that Prof. Gray, at the time of his visit to the Pacific Coast in 1877, informed him that "the report of its being derived from Sequoyah the Cherokee was doubtless an afterthought; that undoubtedly Endlicher derived his name from sequi or sequor, alluding to the well-known fact that our redwoods are the followers or remnants of several colossal extinct species."

Further investigations do not throw much additional light on this subject, and the answer sent in reply to Mr. Lemmon's inquiries by a number of distinguished men are not very satisfactory in their conclusions. The venerable De Candolle writes: "The supposed origin of Sequoia from Sequoyah or Sequamal is entirely fanciful. By the appearance of the name it is probable that it originated from or was taken up from some native word and written more or less correctly. Historically, it is a matter of regret, of course, that any doubt rests upon the origin of the name of the two trees which surpass all others in size and in the interest attached to the history of the genus to which they belong; but, after all," as De Candolle writes, "it matters little—a name is a name. The essential things are, first, that it be the expression of a natural genus; second, that it has not been employed before; and third, that the genus has not previously received another name."

Mr. Lemmon's paper contains, in convenient and acceptable form, a great amount of useful and interesting information, botanical, historical and economic, relating to the trees which compose the larger part of the Pacific Coast forests, and which make these forests the most wonderful and important forests of conifers known to man. It will be welcomed by all serious students of American trees, and will take its place in the permanent literature of the subject.

[We recently stated that copies of this report can be had (sending 10 cents to pay for mailing) by application to Prof. J. G. Lemmon, 1015 Clay St., Oakland. He can also supply a limited number of the Report of 1889, which contains his essay on the Pines of the Pacific Coast—not the "prince" of the Pacific Coast as the '90 had it in our issue of April 18th.—Eps. Press.]

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SOUTH EUREKA.—*Ledger*, May 2: The hoisting works, rope, etc., and boiler and engine of the Ilex mine in Calaveras county, have been purchased for this property. These works are in splendid order, and were secured at a bargain. It may be a week or two before the work of taking them down will be commenced, and they will be immediately thereafter removed and erected for prospecting operations on the South Eureka property. With these works the ground can be explored to a depth of between 1200 and 1500 feet. The boiler and steam-power will be kept as a reserve in case of a break or failure in the water-power. Water power will be put in at once. To gain the necessary pressure of 180 feet the wheel will probably be located at the bottom of a gulch, and from thence the power will be transmitted by wire cable 500 feet to the hill on which the shaft will be located.

HARDENBURG.—A mishap occurred at this mine the latter part of last week. The mill was fixed in running order, and water was turned into the pipe, but before the full pressure was on the pipe burst in a number of places, showing that it was useless for the work demanded of it. It was old pipe, used on the Mello claim. It has all been taken up, and new pipe is being made by C. O. Mitchell in Sutter Creek. The disaster will delay the starting of the mill from 10 to 12 days.

CARRARA MARBLE CO.—The work of making the road from the quarry to the main county road was commenced last Monday. A Chichizola, the contractor, has a large force at work and intends pushing it to completion as soon as possible. An important item of news was received by parties interested in this quarry this week, to the effect that the managers of the company below had negotiated for the delivery by September next of \$20,000 worth of the marble, to be used at the Stanford University. The arrangements to this effect are reported to be as good as completed. A better advertisement for Amador marble could not be had than its use in a great public institution like the Stanford University.

BELMONT.—The Superintendent says: At this mine the surface tunnel is now in 280 feet, the last 100 feet all in ore. The 10-stamp mill is doing good work, being supplied with ore from tunnel level. The company are now figuring on a larger milling plant, as they have developed a large body of ore.

Butte.

BIG BEND.—*Nevada Transcript*, May 1: Work has been resumed on the Big Bend River mine, above Oroville, this summer. Dr. Pierce of Buffalo, New York, the president of the company having sent word to the foreman to prepare to commence again.

WILL RESUME.—It is said that the quartz mine near Forbestown, owned by W. W. Stow of San Francisco, and which was worked last summer, will resume operations again soon, and will work the ore by Huntington crushers, which are now on the way to the mine.

Calaveras.

SINKING.—*Calaveras Chronicle*, May 2: The work of sinking at the Smith mine near West Point is progressing steadily under the superintendency of Wm. Sales, Esq. The mine is supplied with steam hoisting works and all the necessary appliances for the development of the mine. The ore is said to be good and all indications point to a permanent piece of mining property.

MILL RUNNING.—The mill at the Sandy Bar mine has been running steadily since Tuesday of last week crushing rock from the Mammoth mine. Mr. E. H. Davison, who has the management of operations, informs us that the rock is looking well.

HALLOCK.—*Mt. Echo*, May 1: The work of erecting a 20-stamp mill on the Hallock mine, near this town, goes bravely on. Mr. Hallock evidently means business and doubtless will succeed. It is said that the sulphurets in this mine are of a higher grade than any in the county.

Nevada.

PEABODY.—*Grass Valley Union*, May 1: The new incline shaft on the Peabody mine, which was commenced a few weeks ago, has been sunk and timbered to a depth of 160 feet. The shaft is in three compartments, 14x5½ feet in the clear and has been timbered throughout, which shows that the work has been done with remarkable speed. The ground has been very favorable for sinking. Much credit is due to Supt. Tilley in having the work pushed with so much energy. The shaft has to be sunk to the depth of 240 altogether to connect with the lowest level of the mine.

WYOMING.—*Grass Valley Union*, April 29: The Wyoming M. Co. expects to commence putting up machinery for hoisting and pumping during next month.

NORTH BANNER.—A gold brick weighing 263 ounces was brought in from the North Banner mine yesterday, being a partial cleanup for the present month.

THE CROWN POINT mill is running steadily, night and day, on quartz from the New Eureka mine.

BRUNSWICK.—*Grass Valley Union*, May 2: Supt. Fitzgerald of the Brunswick mine, in his last letter to the home office, New York, says: Ledge in drifts is about the same, except in quality of quartz in the east, which has improved. Ledge not so wide but is liable to change for the better any time. I am nearing the chute above; expect to strike it in the next 50 feet; see no reason why I should not. I am following the ledge between two well-defined walls and am in good quartz all the way.

DOINGS OF PROSPECTORS.—*Nevada Transcript*, May 2: A test crushing of some ore from Red Hill is being made at Socklin's mill. Clemo & Co. are prospecting for quartz on the Half Mile House property. At the Centennial drift claim on the Washington ridge an upraise will be made next week in the hope of finding gravel. Bert Guild is taking some ore from the old Nicholson ledge near Chinatown. Ex-City Marshal Baldrige and a partner are working over some bedrock in the Manzanita claim, and they are just about making wages. The Mountain Chief is the name of a very promising quartz claim in Willow Valley, not far from the Deadwood mill, and which is worked by Joseph Dean

and Oliver Ragon with good results. Ore taken from it has milled as high as \$82 a ton. Recently J. C. Locklin has made arrangements to assist Messrs Dean and Ragon in going down on the ledge below water level, and Mr. Locklin's hoisting and pumping machinery is being put up on the claim. Steep Hollow is a lively section this spring. The Steep Hollow Co. is completing a road so as to get in supplies and tools. John Hussey has an encouraging quartz prospect. Beightol & Co. have gravel in their Bald Eagle claim, but are pushing their tunnel ahead with the hope of finding some good quartz.

Shasta.

COAL.—*Adin Argus*, April 30: About 20 miles this side of Anderson, Shasta county, has been discovered a coal mine which is attracting no little attention. While coming by the new discovery recently, H. S. Brown obtained a sample of the coal, which Mr. Leventon, the Lookout blacksmith, pronounces better than he has received from Sacramento.

Sierra.

A GOOD GRAVEL STRIKE.—*Nevada Transcript*, April 28: At the Occidental drift claim between the old Bald Mountain and the Bald Mountain Extension near Forest City, Sierra Co., Captain Bradbury ran a tunnel in a distance of 125 feet and then made an upraise, and recently struck gravel that prospects well. A company formerly spent many thousands dollars in the same ground without getting a prospect, the long tunnel they ran being to one side of the channel.

LONE STAR.—*Mt. Messenger*, May 2: The Lone Star Quartz M. Co., whose office is at Grass Valley, has had a survey made for a patent for its property situated in Gold Valley, twelve miles from Downieville. Al. Smith, Arthur Lamay and Charley Fricke, sinking a shaft at the lower end of Fournier's ranch, have gone through a pipeclay deposit and are probably, not far from bedrock. The Cleveland quartz mine, at the head of Nigger Canyon, is doing very well.

GOLD.—For a 24-days' run, the Mercer & Salinas quartz mine produced nearly three thousand dollars in gold. This is doing remarkably well, the working expenses being very light.

Trinity.

MINE BONDED.—*Trinity Journal*, May 2: Robert Woodburn of Lake Valley, El Dorado Co., was here this week taking a look at some mines. He was sufficiently impressed with the Fisher Gulch property to take a six months bond on it and will begin development work at once, erecting a mill on the mine during the summer if the prospects warrant such a move. Wm. Berry who came up with Mr. Woodburn will have charge of the work and will probably have everything ready for operation by next Monday.

Tulolumne.

HYDE.—*Union-Democrat*, May 2: The news from the Hyde mine, now called the Belle View, is favorable. The 10-stamp mill is yielding a good profit and 10 stamps more are to be at once added to the mill. The Mary Ellen, situated on the main Tulolumne river near Groveland, has been incorporated in San Francisco and work energetically started on it. The mine is looking well. The ground belonging to the company is very extensive, comprising some 12 claims of 1500 feet each, with a good millsite. Mill work on this mine, as well as assays of the ore, have given such good results that no doubt exists that the mine will prove a profitable property. Mr. Geo. Stayton returned from Gilroy last Wednesday, where he has been to confer with his associates in the Badger mine, situated near Jamestown in this county. The work of development on the mine will now proceed vigorously. Alexander McDonald, a mining capitalist of San Francisco, arrived in Sonora Wednesday. He has now in view the purchase of the rich river claim owned by Chas. Fitch and which is situated on the Stanislaus river at Byrne's Ferry. In the Little Bonanza mine, better known as the Colby, situated at the upper end of town, a rich strike was made this week. The Kanaka mine has now developed into a good paying property. The mill has been steadily at work for five months, and the value of the ore has been now determined by practical mill work and found to give a fine profit over all expenses of mining and milling. When five more stamps are added to the mill—and this will soon be done—the profits will be larger in proportion.

NEVADA.

Washoe District.

CON. CAL. & VA. MINE.—*Virginia Chronicle*, May 2: 1100 level: The blower station started in the south drift from the shaft station on this level has been completed and the blower and driving engine are now in place. We are still easing timbers and replacing broken caps in this drift. This work will be completed in four or five days, and then we will resume work in the face of the drift. 1500 level: The width and quality of the ore which is shown in the opening 43 feet above the sill floor of this level continues to hold good, and we continue to find this ore body extending to the northeast, and the ore there continues to be of fair quality. We are continuing to stoop out ore of good quality at the end of the crosscut run west from the north drift on the sill floor of this level. 1650 level: The usual quantity of ore has been extracted from the openings of this level, and we are continuing to extract ore of good quality in working out from the winze No. 2, at a point 35 feet above the sill floor of the 1750 level. Winze No. 3 has been sunk 23½ feet; total depth, 103½ feet, and connected with the crosscut run west from the southwest drift on the sill floor of the 1750 level. The end of the southwest drift on this level has been carried up 14 feet; total height, 55 feet, and some milling ore has been extracted therefrom, 1750 level: An upraise started near the face of the drift run southwest from the northwest drift from the main west drift from the C. & C. shaft has been carried up 16 feet on an ore streak from which some milling ore has been extracted. There has been extracted from all parts of the mine during the week 1,485 1190-2000 tons of ore, which was shipped to the Eureka mill. The average assay value of all of the ore worked at that mill during the week (1545 tons) was \$33 10 per ton. In addition to the Eureka mill, the Morgan mill commence working ore from this mine about May 10. Bullion now on hand in our assay office,

assay value, about \$30,000. Bullion shipped to Carson Mint, assay value, \$51,747.18.

OPHIR.—Have continued to extract ore from the upraise which was carried up from the drift run south from the drift run west from the winze 122 feet below the sill floor of the 1300 level. The ore which was stored in the mine is being hoisted to the surface, and there has been shipped to the Morgan mill during the week 157 tons of ore, on which the mill has commenced running.

OVERMAN.—Extracted from 1000 and 1100 levels 570 tons of ore. Car samples average \$15.48 per ton. Shipped to the Brunswick mill 598 tons of ore.

HALE & NORCROSS.—On the 1400 level of Hale & Norcross No. 5 east crosscut near the south boundary was advanced 15 feet; total length, 95 feet; face is in porphyry. The winze started at the end of No. 3 east crosscut is down 30 feet; the bottom continues in ore. The main incline is repaired and retimbered to the 1500 level, and will soon be able to reopen the 1500 level station.

KENTUCK CON.—Have started a west drift in the west ledge, 1000 level, from the top of the raise where it connected with the 950 winze; the face is in quartz assaying from \$5 to \$7 a ton.

UTAH.—South drift at the point where the raise was carried an incline has been sunk 22 feet, passing through vein porphyry and seams of quartz of low assay value.

OCCIDENTAL.—Extracting pay ore from the stopes on 350, 400 and 450 levels. The south drift from No. 1 upraise, 500 level, is in 77 feet in low-grade ore.

ALPHA AND EXCHEQUER.—But little work has been done in the above mines the past week, owing to repairs to the shaft.

SILVER HILL.—Northwest drift, 50-foot level, is out from the shaft 145 feet; face in porphyry. North crosscut, 160 level, is out from the winze 7½ feet; face in hard porphyry.

CHOLLAR.—The south lateral drift from the north line, 1400 level, is out 93 feet; face in porphyry. Extracted and sent to the mill during the past week 542 tons of ore, worth as per battery samples \$19.22 per ton.

POTOSI.—The south lateral drift from the winze station, 1300 level is out 120 feet; face in porphyry. The winze is down 41 feet below the 1400 level; the bottom is in clay and porphyry.

ANDES.—The east crosscut from north drift on the 420 level was extended 76 feet; formation somewhat softer than last report.

SIERRA NEVADA.—630 level: West crosscut No. 1 from the northwest drift 571 feet from the shaft, has been advanced 44 feet; total distance 315 feet. Formation somewhat softer than last report.

BEST & BELCHER.—1000 level: North drift has been cleaned and repaired 80 feet; total length, 600 feet. 1100 level: Northeast drift has been advanced 25 feet, through a soft porphyry; total length, 125 feet. West crosscut has been repaired 160 feet.

GOULD & CURRY.—200 level: Have extracted from the old stopes during the week 126 cars of ore. Sent to the Nevada mill 250 tons of ore; average battery assay for the month, \$22.

UNION CON.—East crosscut No. 2 on the 1465 level, started from the north lateral drift at a point 200 feet north from the south boundary line of the mine, has been extended 28 feet; total length, 87½ feet; passing through soft vein porphyry with some clay and fine lines of quartz.

ALTA.—Steam is up and the resumption of work in the mine has begun, and a prosperous run is looked to.

YELLOW JACKET.—The usual prospecting work is being done throughout the mine, and extracting some pay ore.

BELCHER.—Have stopped No. 3 west crosscut on the 300 level in the west ledge to permit the water to drain off, and have started a north drift from the main west crosscut from the shaft opposite the south lateral drift, same level; the face is in low grade.

CROWN POINT.—The 1000 level east crosscut is out 41 feet, having been extended 20 feet during the week; the face is in a mixture of porphyry and low-grade quartz.

CHALLENGE AND CONFIDENCE.—The joint Confidence and Challenge east crosscut on the 600 level is out 23 feet, having been commenced during the week; the face shows quartz having no value. The joint Challenge and Confidence north drift on the 1100 level is in 189 feet, 25 feet having been made during the week; the face shows quartz having no value.

SEG. BELCHER.—On the 600 level the east crosscut from the south lateral drift is out a distance of 290 feet, having been advanced 20 feet during the week. Have stopped it, and will start a west crosscut from the lateral drift at a point about midway in the ground.

JUSTICE.—The south winze on the 490 level is down 6½ feet. The bottom is in a mixture of quartz and porphyry, with streaks of ore running through it. The north drift on the 822 level is out 632 feet. The face is in quartz giving assays of from \$15 to \$25 per ton.

SAVAGE.—We have hoisted 653 cars of ore from the 500, 750, 800, 900 and 950 levels and from the intermediate drifts north and south from the winze below the 1300 level. Shipped to the Mexican mill 566 tons and milled 490 tons; average battery assay, \$17.30. We have haulion on hand amounting to \$23,100. On the 1100 level they are prospecting and drifting on the ore recently found, preparatory to more extensive explorations.

Cherry Creek District.

STAR.—White Pine News, May 2: At Cherry Creek, to the north of us, A. M. Ellsworth has the mill near the tunnel at the old Star mine completed and will soon commence working the dump. This may be the prelude to more extensive operations and better times for our neighbors down the valley.

Cottonwood District.

THE INGERSOLL MINE.—Mr. James Harvey of the Ingersoll mine in Cottonwood canyon, four miles south of Unionville, informs us that they have traced the ore on the surface for some 760 feet. They have run several drifts on the lode, being in ore most of the time. The lower tunnel is in 60 feet and about 280 feet below the upper works. They have sunk a winze 60 feet below water level, it being in good ore the entire depth. The ledge at that depth is 18 inches in width; the ore is a bright carbonate as they gain depth. This location is on the same belt with the once famous Moonlight lode, the ore of which

worked as high as \$2000 to the ton. It is supposed to be an extension of that vein.

Eagle District.

PART OF DEEP CREEK COUNTRY.—Salt Lake Tribune, May 2: John Tippet, recorder of Eagle mining district, in the Deep Creek country, arrived in the city yesterday. The district is some 25 or 30 miles southwest of the Deep Creek station, hence it is in White Pine county, Nevada, and embraces part of Eagle range, or Kern mountains. Mr. Tippet has lived there for the past seven years, all of which time he has been prospecting, working on his numerous claims and taking out enough ore to keep him and what help he hired. He has shipped mostly from his Harrison mine, located in granite, having a vein three to six feet wide and producing ore that went 300 to 500 ounces silver, with very little lead or copper. He ran a tunnel on this vein 100 feet, in ore all the way except some 10 or 15 feet. On his Anna he has a shaft down 60 feet and has taken 100 tons of ore out of the mine, which went 500 to 600 ounces in silver. The vein is 5½ to 6 feet wide, one-half being rich, while the other is second class, but with a mill would pay well to work. It is chloride ore, and hence cannot be concentrated without great loss. The Paymaster produces ore up to 150 ounces silver, 25 per cent lead and carries some iron. This vein is 10 or 12 feet wide and has been opened but little. But few persons are in Eagle as yet, probably 20 in all, who are prospecting and working on their claims.

Osceola District.

PLENTY OF WATER.—White Pine News, May 2: Osceola, on the south, is also receiving attention from Eastern capitalists. The Gravel Mining Co., with plenty of water this season, will turn out many shining bars of gold, and the dry-washers will add to the general output and prosperity of that district.

White Pine District.

AT HAMILTON.—White Pine News, May 2: Over at Hamilton, the old district is also claiming the attention of mining men of experience and capital, and it is not improbable that by the 1st of June some of the rich silver lead mines around White Pine mountain will have passed into the hands of San Francisco capitalists. Supt. William Read will also resume operations on the old Eberhardt tunnel. All this means a great revival of business for White Pine's first capital.

ARIZONA.

A GOOD PROSPECT.—*Tombstone Prospector*, May 1: Mulzar Osborn came in to-day from Dos Cabezas and reports some activity in that neighborhood. An eastern company has taken hold of the old Rouse claim on the road near Apache pass and have placed a whim on it. They will sink 100 feet and drift 50 feet each way for an interest. The shaft, when they took hold of the mine, was 50 feet deep and water hoisted there. The ledge there was three feet wide. At 60 feet, where they are at present, the ledge is five feet and widens as work progresses. If the mine looks well at 100 feet they propose to put up five or ten stamps on the mine. There is water in abundance at 10 feet right at the mine and plenty of wood. The ore milled \$8 without sorting at 50 feet, and also carries about nine ounces of silver.

A HUACHUCA PROSPECT.—*Tombstone Prospector*, May 2: A. Frowde who has a ranch in Miller canyon Huachuca mountains, brought in a sample from a ledge on the summit of the range for assay and is much pleased over the result. He has a shaft down 50 feet on the ledge and crosscuts showing 12 feet of ore. The samples were taken from the bottom of the shaft. One sample shows 22 per cent lead and 13 oz silver. The other gave 25 oz silver and 13 per cent lead and \$4 in gold. Mr. Frowde will endeavor to get some one to run a tunnel from the bottom of the mountain to tap the ledge. He estimates that such a tunnel driven 700 feet would strike the ledge at 1500 feet down and at the same time bring the ore out to a comparatively level country. There is water in abundance and some of the finest timber in Arizona at the mines. The ledge runs along the top of the mountain almost on the backbone and is a contact between lime and porphyry. Mr. Frowde also states that there are immense bodies of manganese ore close to these mines.

BRITISH COLUMBIA.

A GOLD INTEREST SOLD.—*Donald Truth*, May 2: An impression prevails on the outside that the mineral of the Kootenay Lake country is either silver-lead or silver-copper, and that gold is only found in combination with these minerals. This is a wrong impression. Lying between Eagle and Rover creeks and extending southward from Kootenay river is a belt in which over 100 hundred locations have been made. The ledges are well defined, as far as depth has been attained, and vary in width from 18 inches to 6 feet, and even wider. The ore is free milling on the surface, and carries from \$20 to \$750 to the ton in gold. The Poorman, on Eagle creek, the Whitewater, on Rover creek, the Royal Canadian, between Eagle and Forty-nine creeks, and the Wild Cat, near Eagle creek, are the best known of these gold properties. The Poorman's output last year yielded 330 to the ton, and a mill test of ore from the Whitewater gave a return of over \$100 in gold. Work is now being done on several of these claims, and the Poorman 10-stamp mill will be started up the first week in May. That they are attracting the attention of capitalists is evidenced by the fact that this week a quarter interest in the Wild Cat was sold for \$12,500 by Hugh McRae to R. C. Ferguson and R. G. Tatlow of Vancouver. H. H. Keefe still retains his half interest, and Mr. McRae a quarter. If arrangements can be made, 30 tons of ore now on the dump will be run through the Poorman mill to test its value and if a satisfactory return is had machinery will be placed on the property at once. The claim is opened up by over 200 feet of tunnels and crosscuts, and several thousand tons of ore are exposed. The width of the ledge is not known, only one wall being exposed by the work done. The vein matter is similar to that in the Poorman, that is, quartz carrying free gold and sulphurets.

NEW FINDS IN GOAT RIVER DISTRICT.—Reports from Goat River district are very encouraging. Several new discoveries have been made lately, chief among which, is one by C. C. Sproule and

George Long, at a point about half a mile above "Jap" King's Alice. The owners of the Alice have done considerable work this spring in making trails and roads.

DUST ARRIVING FROM HALL CREEK.—The first dust from Hall Creek placers came to Nelson this week, and is good-looking coarse gold. While no sluicing has been done on any of the claims, owing to the depth of snow, good headway is being made on drain ditches and other preparatory work. The boys on the ground are all jubilant, several of them claiming that the diggings are good for an ounce a day to the man.

WORK TO BE COMMENCED.—The provincial government has taken prompt action on a matter that concerns the mine owners of Toad Mountain district. Work is to be commenced at once on the wagon road from Nelson to the mines on Toad mountain.

COLORADO.

THE CRYSTAL PROPERTIES.—Aspen Times, May 1: T. O. Bryan came in from Crystal yesterday and gives the following information concerning the properties of that locality: The famous Black Queen mine is closed down owing to litigation, and the time of its resuming operations is a matter of conjecture. Cass and Ferris, of Aspen, are working a small force of men on the J. B. Wheeler claims, on Sheep mountain. Joe Paxton has at last struck it rich in the Illinois, and his friends congratulate him on his well deserved success. The Paymaster is now turning out some very rich ore, and bids fair to be a fine producer. The trail from Carbondale is again passable, and Crystal will now enjoy easy communication with the outside world.

DAKOTA.

BULLION.—Deadwood Pioneer, May 1: Two magnificent specimens of the recent strike in the Bullion mine at Galena were sent over yesterday by Superintendent Sprando, and placed on exhibition. One piece weighed about 200 pounds, and fairly glistened with galena and lead carbonates. It is stated that the ore will go 400 ounces of silver per ton, and from 50 to 60 per cent lead.

GARDEN CITY.—The erection of the Keystone chlorination works has set in activity the location and representation of claims in the Garden City district, and every day a number of location certificates are filed in the register's office from this district.

TIN.—Capt. Taylor is making satisfactory progress with his Nigger Hill tin mines. Ore of good quality is being piled up on the dump, charcoal is being burned, and the erection of the mill progressing as rapidly as possible.

IDAHO.

THE TRUMP.—Wood River Times, May 1: Work has been quietly prosecuted on the Trump mine, at the head of Rock creek, since last November. Capt. Black and his associates are now rewarded by the opening up of a large and rich body of heavy galena ore. The ore is a heavy galena carrying from 60 to 65 per cent lead and 100 ounces silver to the ton.

RED CLOUD ORE.—Mr. Brasse, the contractor, has resumed the hauling of Red Cloud ore to Hailley. He brought down 300 sacks last week and will continue to haul right along. He says that, as near as he can guess, there are between 300 and 500 tons on the dump, and an average of 10 tons is extracted daily.

BOISE BASIN.—Cor. Idaho Statesman, April 31: The placer mining season is opening up throughout the Basin with very good prospects. The water supply is very good but not as abundant as last year. Considerable snow remains in the mountains, which will prolong the water season and continue the supply for two or three months. Among the hydraulic claims in operation on this side of the Basin may be mentioned those of John Peeke and Ed Maloy & Co., at Cold Spring, Cramer & Trader and Van Tim & Lass, on Last Chance bar, John Riordan, in California gulch, Wm. Barker on Steamboat, White, Reel & Kearney, between Pine and Bannock creeks, Brockmiller & Spiero at Walla Walla flat, and Asbury Turner on Buena Vista bar. At Centerville Hon. Stephen Dempsey is tearing away the bank in his claim and several others on Grimes and Granite creeks have started up. At Idaho City, K. P. Plowman has water through his ditches and the two large chiefs will be in operation in the course of a few days. Hon. Ben Williams has a crew of men at work cleaning out his ditches at Pioneerville, but piling will not commence until about May 10th. Besides the claims mentioned there are many others of minor importance that will add largely to the gold product of the Basin this year. While the placer mining industry is waning it is still of considerable importance, and enables many owners of quartz prospects to keep up the assessment work and develop their veins. Our quartz interests for the present, while capital is slow about coming in, are dependent to no little extent upon the placer mines. Boise county can show a less number of failures for the number of mines worked than any other county in the State. The Gold Hill mill at Quartzburg, has run constantly for over 20 years, and there has hardly been a month that it has not paid more than expenses. The shaft of the Washington mine, in Gambrian district, has reached the 300-foot level below the bed of the creek. On the 200-foot level a vein of argentiferous ore from one foot to 18 inches in width has been developed a length of over 100 feet and the end is not yet. It is understood that the roasters will be erected this year, so that the silver can be treated. The Elmina mill at Banner, having run short of wood and salt, has closed down until the roads are passable, which will be about the 1st of June. The yield during the past year has been large, and since the closing up of the road in February, 80,000 ounces of silver has accumulated. Henry Whitney, Superintendent of a Boston company's mines between Grimes and Muddy creek above Pioneerville, will start up the new 20-stamp mill in two or three weeks. Wm. Sweet has started a new two-compartment shaft on a mine at the head of Big Muddy. He will sink it to a depth of 400 feet, and if the mine continues good at that depth, will develop it to the depth of 1000 feet by a tunnel from the Payette side of the mountain. The Gold Hill 25-stamp mill at Quartzburg, continues pounding away day and night on ore from the Pioneer mine. This is the largest vein now working in Boise county, being 60 feet between walls, which is milled

without assorting. Were this property in Colorado or Montana it would have a world-wide reputation.

LOWER CALIFORNIA.

MILL BURNED.—Lower Californian, May 30: Lane's mill burned down last evening at 5:15. The flames started from a fire in the forge and in ten minutes the building disappeared from the face of the earth. The mill had not been running yesterday. A large house near by was barely saved. The mill machinery, engine and boiler can be saved, making the net loss about \$2000. There was no insurance. Col. Lane will not rebuild. The Indian mine closed down permanently yesterday, and the pumps and machinery will be moved to the San David. The ledge pinched out. The Princess mine starts up soon. The ore in the Aurora has run out and sinking has commenced on the mine. Some fine-looking rock is being taken from the deepest shaft of the Aurora, and it not only pays well but has strong indications of silver. All the working mines of the Princess Co. are looking well and Captain Rodda keeps them going in full blast. The Princess mill works night and day on rock mainly from the Gold Tree. The other mines are being worked at present more for development and depth than for ore extraction. The El Paso mine and mill continue busy under Supt. McLaran. The vein develops well in size and richness. The Montezuma Co. is said to be preparing to resume work. The mine adjoins the San David on the flat between the Aurora and El Paso, and is very rich so far as prospect. Its location makes the water question of great importance, and large pumps are necessary on both it and the San David.

MONTANA.

AT BUTTE.—Inter-Mountain, May 2: The Anaconda and St. Lawrence mines yet remain in a state of partial suspension. The water continues to be poured into the shaft of the latter, and the thousands of men who found employment at these works are either parading the streets with those already out of employment or else gone to other parts in search of work. These men being thrown out of employment causes much hardship, and hope is expressed by both those who are now employed and unemployed that the differences existing between the two great corporations may soon reach an amicable adjustment. The mines thus far are giving employment to but a few men, and they are only doing such work as is necessary for the care and preservation of the property. The mines that have thus temporarily suspended are the Mountain Con., Jim, High Ore, Green Mountain, Anaconda, Modoc and St. Lawrence, mines giving employment to about 1500 miners underground, besides the number who find employment in an indirect way on the surface. In most of them at present sinking is in progress and will continue during the fall or until another road is completed into the town of Anaconda. Reports have been in circulation during the past, and the information has emanated from quite a reliable source, that work would be resumed on or about the 15th of this month, and from the activity in the yards of the Montana Union, it would lead one to believe the time to be not far distant. The Boston & Montana from the first day has increased its output under the capable and careful management of Superintendent Couch. Improvements have been started by some of the larger properties, showing a disposition to keep step with the times. The Parrot Company has commenced the erection of a large and commodious hoist that is now nearing completion and is an ornament to the town and camp. It entirely engulfs the old one, which was in itself a good-sized building. The foundation or bed for the large engine is being put in position. This massive piece of machinery, when once in position, will be the largest in the camp with no single exception. The next in size will be the large one about to be put up on the Leonard shaft in Meaderville. Both engines will be here just as soon as they are completed. The Parrot engine is now near to completion, while the Leonard engine, a more delicate creation but as powerful, may not be here for a few months. All the mines and mills on the bill are again in full blast. The Alice is running entirely on her own ore, while the Lexington, though doing some custom work, depends mostly on its own output. The Moulton has resumed the working of custom ore and again the mill is running continually. This mine, when once the shaft is down, will take its former place as one of the greatest producers in the district. In the Burlington country prospecting is again in vogue, and many of the leasers are hunting up prospects. The West Nettie changed hands and is now under an entirely different management. The boys are holding their own in a manner that is a credit to the mine. The Blue Bird is working a full complement of men, both in the mine and mill, and a quantity of ore is being taken out that promises well for the next dividends. This is one of the best managed mines in the camp. Some of its underground workings is timbered with square sets, while mostly stulls are used. The ground in this mine is very loose and can be handled only by practical and experienced miners. The mill is under the personal supervision of Mr. Monroe, and since he came into the superintendency of this property the bullion has become better than ever before. The miners of the Park canyon country have for the past week been bending their energies to discover what is on the surface, with the exception of the Homestake, which is satisfied in developing in depth and in which they are reaping their just reward. The Clinton Company persists in pushing through the mountain and is in already 700 feet. The tunnel is still being sent in as fast as men and money will allow. The ore is scattering, though the company has a strong ledge. Some very fine streaks of ore have been encountered, giving warrant that if depth is attained the future of the Park canyon country would be solved and a second Butte arise in that vicinity.

NEW MEXICO.

DEVELOPMENT WORK.—Silver City Enterprise, April 24: The International smelter folks have, about closed a deal for the delivering of 600 tons of second-class ore from the Bachelor mine at Volcano. The Mountain Key shipped 100 ounces of gold last week. The concentrates equal in value the free gold saved on the plates and the two together make a good weekly showing for a 15-stamp mill. A good

deal of work is being done at Chloride Flat in a quiet way. Joe Avey and the Jones brothers have a lease on the Flagler mine, from which they expect to extract a considerable amount of good ore. Tom Fox, of Stein's Pass has struck some very rich ore two miles south of the railroad. Two assays gave as a result 1121 ozs. silver and 1589 ozs. silver and \$160 gold per ton. Gibson & Johnson of Lordsburg have unearthed a bonanza west of Lee's Peak. The find consists of a deposit of heavy lead-silver ore and promises to pan out well. The ore is a heavy galena. Nat Bell, of the firm of Bell & Stephens, of Pinos Altos, went over to the Golden Rule mine on Tuesday. Mr. Bell has every confidence in the mine and believes it can be made to pay good profits. He will ship a lot of the ore to Pinos Altos for treatment by special process as the ore cannot be worked by amalgamation and hence the failure of the former operators of the mine. Charles Clair, of Shakespeare, who was in town Wednesday, informs the Enterprise that parties have recently visited his camp and bought a number of the old dumps, and are now shipping the ore to El Paso for reduction. He also states that sampling works will soon be erected at Lordsburg by Chicago parties. The machinery has already been ordered. Mr. Clair predicts that in six months the old camp of Shakespeare will be the best camp in Grant county. Add to the Bell & Stephens and Mountain Key gold shipments those of the Pacific Gold Co., the Aztec, Skillicorn & Snyder, and McDonald and company, and it will be found that Pinos Altos makes a better showing than any gold mining camp of its size in the United States. Four years ago these properties were all lying idle as are many other good properties to-day for lack of capital to furnish mills for the reduction of their ores. On the 20th of last month Messrs. Bell & Stephens brought down from Pinos Altos 65 pounds of melted gold in bars and again on last Monday 40 pounds more. This makes a good showing for the first month's installment on the proposed one ton gold brick for the world's fair. One hundred and five pounds per month will not quite fill the bill but the mill has not been running full time. Hereafter the shipments will probably be larger and the display at Chicago when the fair opens will be fully one ton weight of pure gold.

OREGON.

MINING SALE.—Bedrock Democrat, April 27: The necessary papers were yesterday executed, conveying a one-half interest in the Montana mine, situated in the Greenbush district to E. L. Groux of this city. The mine was discovered several years since by J. B. Hunsaker, who still retains the other one-half interest. Considerable development work has been done on the property. The vein is of a good milling grade and the ore is free milling, assaying \$7 in gold and \$167 in silver per ton. The consideration of the sale was \$2000.

PLACERS.—Chas. Blalock and J. E. Alexander are opening up extensive placer mines on Goose creek and so far their prospect is good.

The Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:

ARIZONA MINES.		Cash.	Debt.
Challenger	.....	\$ 6,181	.....
Locomotive	.....	1,519	.....
Peer	.....	241	.....
Peerless	.....	.....	884
Silver King	.....	.....	143
Weldon	.....	2,025	.....
BODIE MINES—CALIFORNIA.			
Bodie Con.	.....	19,296	.....
Bulwer	.....	9,901	.....
Mono	.....	5,430	.....
Standard	.....	40-3	.....
Syndicates	.....	3,217	.....
COMSTOCK MINES—NEVADA.			
Alpha Con.	.....	25,094	.....
Alta	.....	20,085	.....
Andes	.....	1,373	.....
Belcher	.....	16,499	.....
Best & Belcher	.....	6,085	.....
Bullion	.....	.....	3,070
Caledonia	.....	924	.....
Challenge Con.	.....	.....	765
Chollar	.....	.....	474,683
Confidential	.....	3,340	.....
Con. Cal. & Virginia	.....	108,049	.....
Con. Imperial	.....	.....	27,473
Con. New York	.....	2,225	.....
Crown Point	.....	.....	1,408
Exchequer	.....	12,461	.....
East Sierra Nevada	.....	457	.....
Gould & Curry	.....	12,845	.....
Hale & Norcross	.....	14,564	.....
Julia Con.	.....	1,944	.....
Justice	.....	.....	3,809
Kentuck	.....	96	.....
Lady Washington	.....	23,988	.....
Mexican	.....	19,143	.....
Occidental	.....	6,971	.....
Ophir	.....	.....	7,736
Overman	.....	15,581	.....
Potosi	.....	.....	33,182
Savage	.....	.....	28,679
Soc. Belcher & Mides	.....	.....	9,881
Scorpion	.....	.....	138
Sierra Nevada	.....	2,703	.....
Silver Hill	.....	3,559	.....
Union Con.	.....	1,017	.....
Utah	.....	.....	737
TUSCARORA MINES—NEVADA.			
Belle Isle	.....	19,604	.....
Commonwealth	.....	1,324	.....
Del Monte	.....	4,696	.....
Grand Prize	.....	7,113	.....
Independence	.....	2,091	.....
Navajo	.....	223,457	.....
Nevada Queen	.....	9,760	.....
North Belle Isle	.....	32,351	.....
North Commonwealth	.....	17,357	.....
MISCELLANEOUS MINES.			
Eureka Con.	.....	13,169	.....
Holmes	.....	.....	137,201

(A) With bullion to arrive and an assessment to be collected.
(B) Bullion on hand valued at \$51,757.18, with further shipments to arrive.
(C) Due on assessment No. 98, \$2440.50.
(D) On hand 18,355 ounces fine silver and further shipments to arrive as an offset.
(E) A sum of \$12,800 due from other companies as an offset.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING APRIL 28, 1891.

- 451,252.—CULTIVATOR—D. E. Barton, S. F.
- 451,253.—CULTIVATOR ATTACHMENT—D. E. Barton, S. F.
- 451,254.—CULTIVATOR BEAM—D. E. Barton, S. F.
- 451,255.—CULTIVATOR CLAMP—D. E. Barton, S. F.
- 451,256.—CULTIVATOR ATTACHMENT—D. E. Barton, S. F.
- 451,316.—PIPE—J. L. Cahalan, S. F.
- 451,317.—RECEIVER'S CASH BOX AND TRAY—B. F. Carman, S. F.
- 451,299.—MILK COOLER—W. W. Conder, Tillamook, Or.
- 451,319.—SASH HOLDER—G. A. Cooper, Alameda, Cal.
- 451,326.—TENSION AND CUT OUT FOR ELECTRIC RAILROAD—B. Jennings, San Jose, Cal.
- 451,199.—STONE SAWMILL—F. H. Kessler, S. F.
- 451,310.—DOCUMENT FILE—G. F. W. Schultze, S. F.
- 451,138.—SNOW FLOW—Small & Heintzelman, Sacramento, Cal.
- 451,314.—SNAP HOOK—Frank White, Pomona, Cal.

The following brief list by telegraph, for May 5, will appear more complete on receipt of mail files:

California—George F. Campbell, ladder; N. L. Darling, assignor to Benicia Agricultural Works, traction engine; J. J. Oraft, S. F., cable grip; A. Hartung, Nevada City, watch makers' jewel-setting cutter; A. C. Sewell, S. F., hatching machine; Collin Kondro Jr., Nevada City, valve gear for ore stamps; J. W. Lindsay, Fresno, horse-tail holder and rein guard; A. Sommer, Berkeley, neutralizing sulpho-chlorinated oil; L. A. Steger, San Jose, stratified brick; Anale T. Welch, San Jose, veterinary inhaler; James B. Williams, Oakland, insulated electric conductor.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

SASH-HOLDER.—Geo. A. Cooper, Alameda, No. 451,319. Dated April 28, 1891. This is one of that class of sash-holds in which eccentrics or cams operate against the sashes to hold them. The object is to provide a simple and effective device adapted to operate on both sashes, automatic in its locking action, conveniently located, preventing any rattling of the sashes, and capable of being used as a right or left hand lock as may be desired.

RECEIVERS CASH-BOX AND TRAY.—B. F. Carman, S. F. No. 451,317. Dated April 28, 1891. This invention is especially intended for the use of those receivers to whom sums of money are passed at intervals—as for example, the receivers of carfare money, at whose offices the conductors successively repair for the purpose of turning over the money collected. The object of the invention is to provide an easy and perfectly safe receptacle for the transfer of the money from the person paying to the person receiving it, and at the same time to avoid all drafts usually occasioned by the opening of the passage through which the money is passed.

PIPE.—John L. Cabalan, S. F. No. 451,316. Dated April 28, 1891. This invention relates to that class of pipes formed and adapted to be laid in sections, making a continuous course, way, or conduit for any purpose—such, for example, as sewers, water-ways, ditches, gutters, etc. The invention consists in a pipe or way made of independent sections, each section having one flanged and one unflanged end, both ends being parallel and formed on a bevel—that is to say on a plane inclined to the plane of its bottom and top. The invention also consists of a pipe or way made in independent sections, each section consisting of two separate members, one above forming the cover and one below forming the main body of the pipe or way, each member having one flanged and one unflanged end, said ends in each being parallel and formed on a bevel, the bevel of the lower member being the reverse of the bevel of the upper. The object of the invention is to provide a pipeway or conduit for general purposes such as water-ways, ditches, sewers, etc., made of independent sections, the peculiar construction of each section rendering it possible to form tight joints and at the same time to readily remove any section or portion thereof for any purpose that may be required.

SNAP HOOK.—Frank White, Pomona, Los Angeles Co. No. 451,314. Dated April 28, 1891. The object of this invention is to provide a harness and rope snap made of a single piece of spring wire, the hinge of which is durable and of a character which will prevent it from being clogged.

TENSION AND CUT-OUT DEVICE FOR ELECTRIC RAILWAYS.—Byron Jennings, San Jose, assignor of one-half to James Brusie, Oakland, No. 451,326. Dated April 28, 1891. This invention is adapted for use in electric railways of that class in which the conducting wire extends through an underground tube or tunnel having a slot in the upper part through which connection is made between a trolley wheel which travels in contact with the wire and the motor upon the car from which the trolley is suspended. The object is to provide for a suitable tension of the conducting wire, so as to maintain it approximately in a straight line and provide the proper contact between it and the traveling trolley wheel, and a means for cutting out sections of the wire, so it may be properly tested to see if the insulation is perfect, or to detect the point at which the grounding may have taken place.

MECHANICAL PROGRESS

Elastic Cannon.

The segmental-tube wire gun is a new departure in cannon manufacture, which is just now attracting much attention. This gun is a tube of longitudinal steel segments wound with wire and encased in a jacket to protect the wire from small projectiles. The wire is wound under a tension of 50 tons to the square inch. The guns can be built in one-third of the time required to build other big guns, and can be put together in any steel works in the country. The recent test at Fort Wadsworth demonstrated that such guns can stand an extraordinary powder pressure. A 15-inch gun, it is claimed, would throw a shot 15 miles, and with such force at a short distance as to pierce a phenomenally thick target of wrought iron. Another novelty attracting attention is a rapid-fire six-pounder made for the Government, capable of sending a six-pound projectile a distance of at least five miles. The projectile is cone-shaped, made of hardened steel, and so great is its velocity when fired from the gun that it will perforate a six-inch steel plate at one mile without flattening or otherwise damaging itself. Although the gun weighs 848 pounds, it is so skillfully mounted that the merest touch of a finger sets it revolving about its axis, while the firing is effected by means of a trigger no larger than that of an ordinary revolver. The weapon can be handled so rapidly that a six-pound projectile can be sent toward the north and another sent toward the south long before the first shot has reached its destination. If this invention should prove a success after further and crucial trial, it will be a very important achievement.

The inventor, Jobu Hamilton Bedot enumerates the advantages which he claims for his invention as follows:

"There are several points wherein I think we have been able to improve materially on all the large guns now in existence. Working as we do, we obtain a degree of strength, toughness and elasticity in the steel used hitherto unknown. By winding the segments with wire, we are enabled to submit every part of a gun to the most rigid and exacting test, producing absolute uniformity and excluding the possibility of flaws and defects. Our guns can be made with ease and cheapness. There is not a steel plant in the country but that with a very slight addition to its facilities can make them. Inside of six months should occasion demand, we could, with the facilities at our command, turn out 500 completed guns yearly. This gun can be completed in one-third of the time that it takes to build a Krupp gun.

"We calculate that it can be fired at least a thousand times before any part of it gives out. Built-up guns, like the Armstrong and Krupp guns, cannot, as a rule, be fired more than 70 times. Besides, our gun can be fired ten times an hour, while the other big guns can with safety be fired only a very limited number of times in the same time. The greater pressure we are able to obtain insures greatly increased velocity. As a consequence, we can use shorter guns on shipboard without decrease of energy, while by our system, guns can be made of any length desired. For use in the field, we can make guns that will be light without loss of strength. For siege and defense, we can build strong and powerful guns, whose energy and range will be greater than have ever been obtainable in the past."

The inventor very generously refers to Lieutenant Whistler of the Fifth United States Artillery, who has rendered much assistance in developing and perfecting this invention.

A NEW SAW FOR CUTTING ARMOR PLATE.

A new cold saw for cutting steel armor plates is described by a Pittsburgh daily paper. It is in use in one of the largest plate mills and said to give results very much more satisfactory than the ordinary hot saw. It is described as simply a circular saw of fine steel, tempered somewhat hard, and about one-quarter of an inch in thickness at the periphery. It is ground slightly thinner at its center to clear itself easily in a deep cut. It is made to revolve at a slow speed, while the old hot saw was run at a high rate and did its work by means of the intense friction created rather than teeth. It cuts one inch a minute. The machine differs from the ordinary circular saw in this respect, that it is not the work that moves up to the saw, but the work is fixed stationary and the saw is made to travel along the table through it. It is driven by a worm wheel and screw of some four or five feet in length, along which it can be moved easily by hand-screw gear or by self-acting feed gear. The saw runs in a tank of acid, and the greatest care is necessary in regard to the quality of the materials in the solution, which is made up of ten pounds of whale-oil soap, 15 pounds of soda, two gallons of best lard oil, with water added to make 40 gallons of mixture.

A NEW BOILER RIVET.—It often happens in riveting boilers that the rivet bulges in the center, resulting not only in the separation of the plates but sometimes in the splitting of one or both of them. In order to obviate this defect, which very seldom becomes known until the boiler comes into actual use, a rivet has been devised which has a thinned waist, to allow for expansion, and the nucleus of the burr already shaped. The burr is thus practically

started before it receives a blow, and the fiber of the metal is already inclined toward the position it will be ultimately forced to assume. The result is that the rivet holes become properly filled with the slightly expanded waist of the rivet; the plates are closely united; the burr is well formed, and there is no danger of the plates cracking. The riveting is also effected with fewer blows, thus economizing labor.

MAKING BOTTLES BY MACHINERY.—A discovery has been made in the manufacturing line by a concern doing business at Woodbury, N. J., that is worthy of notice. For years glassblowers have predicted that bottles could not be made by machinery. The American Bottle Company, incorporated a few months ago, with works at Woodbury, has demonstrated, and is demonstrating, that the glassblowers are wrong. The new method is very simple. The glass is gathered in the usual manner and allowed to run from the rod into an iron cup, which holds the quantity needed for making the bottle. A hollow iron plunger at the bottom of the cup is pushed up through the mass, and the cup is reversed, leaving the glass in a plastic condition suspended from the hollow plunger, through which air is admitted. The cup, which is hinged, is then removed, and the movement of a lever admits a small quantity of air. The bulb is then flattened at the bottom and dropped into the mould, which is then closed and the air applied. This operation completes the bottle, and it is taken while hot to the annealing oven. By the old process the ring at the top of the bottle neck was formed by a second operation. This is done away by the machine method, and the bottle comes from the mould with a perfectly-formed ring, thus greatly lessening the cost of production.

MECHANICAL STRESS ON STEEL.—The result of investigations made by Oarus Wilson, and by him lately published, on the effect of mechanical stress on steel, shows that, in the case of uniform longitudinal strain on a steel bar, there is a strain of the molecules, also of the elements, and a production of flow by a strain of the elements. The elongation due to flow is, he says, the strain usually observed, and this may be either recoverable or otherwise; again, the strain of an element is made up of a uniform dilatation and a uniform shear about an axis parallel to that of the bar, and, therefore, the flow elongation consists of an increase of volume, together with a certain amount of sliding. The general conclusions arrived at by the author of these experiments are as follows: Mechanical strain produces an atomic disturbance in a bar, and this disturbance increases regularly with the stress; for small stresses the disturbance is only partly permanent, but as the yield point is approached it becomes wholly permanent; finally, the magnetic properties of a loaded bar are in general different from those of the same bar unloaded; but, notwithstanding this general fact, there is a certain stress, or range of stresses, over which the bar is found to have the same magnetic properties, whether it be loaded or not.

DESTRUCTIVE POWER OF BIG GUNS.—"Few people," says a naval officer, "appreciate the tremendous power of the blast caused by firing a big gun on board of a ship. An example of its effects was seen in some recent trials in firing the 67-ton gun of the new battleship *Trafalgar*, considered one of the three or four finest vessels in the British navy. The gun was pointed directly ahead, and fired with a charge of 630 pounds of slow-burning powder and a 1250-pound projectile. The blast produced by the rush of powder-gas and the shot was so tremendous that the plates of the fore-castle were forced in and the deck-beams bent out of shape, while almost every round carried away some fragment of the projecting portions of the ship, even when the training was to the right or the left. It is estimated that the vessel would be reduced to something very like a wreck were 25 rounds to be fired, either directly ahead or directly astern. This interferes with, or renders impossible, firing when either in flight or chase, and has caused our naval constructors to modify the plans for the projected battle ships, as it is not deemed desirable to have them sink from the discharge of their own guns.

CANS MADE BY MACHINE.—A machine that makes cans for a fruit-packing concern in California is just now attracting attention, says an exchange, on account of its great ingenuity. The machine cuts a piece of tin into four parts and then passes them to a feeder, where they are seized by a revolving wheel by which the can is formed. It is completely soldered by an ingenious process, after which the machine tests it by dipping it in the hot water and subjecting it to pressure. When finished by this marvelous machine, the can has no solder on the inside and is perfectly free from acids.

TO CLEAN MACHINERY.—A useful recipe for a mixture to clean the iron portions of machinery and ordinary tools is as follows: Take two to three cents' worth of paraffine, chipped fine added to one litre of petroleum in a stoppered bottle, which for two or three days should from time to time be shaken up until the paraffine is dissolved. To apply it, the mixture is well shaken, spread upon the metal to be cleaned by means of a woolen rag or brush, and on the following day rubbed off with a dry woolen rag.

SCIENTIFIC PROGRESS

THE CENTER OF POPULATION.—The center of population of the United States on June 1, 1890, as given by census bulletin No. 34, was in latitude 39° 11' 56", longitude 85° 32' 53", being a little east of Greensburg, Ind. The closeness with which the center of population, through such rapid westward movement as has been recorded, has clung to the parallel of 39° of latitude is very noticeable. The most northern point reached was at the start, in 1790; the most southern point was in 1830, the preceding decade having witnessed a rapid development of population in the Southwest; Alabama, Arkansas, Mississippi, and Louisiana having been admitted as States and Florida annexed and organized as a Territory. The extreme variation in latitude has been less than 19 minutes, while the hundred years of record have accomplished a movement of longitude of nearly 9.5 degrees. Assuming the westward movement of the center of population to have been uniformly along the parallel of 39° of latitude, the westward movement of the several decades has been as follows: 1790-1800, 41 miles; 1800-1810, 36 miles; 1810-1820, 50 miles; 1820-1830, 39 miles; 1830-1840, 55 miles; 1840-1850, 55 miles; 1850-1860, 81 miles; 1860-1870, 42 miles; 1870-1880, 58 miles; and 1880-1890, 43 miles, a total westward movement of 505 miles in 100 years.—*Railway Review*.

ANALYSIS OF AN ECHO.—To obtain, so to speak, an articulate echo, one that shall be a clear and exact repetition instead of a confused re-echoing of the speaker's utterance, requires that the speech shall be accurately timed in its delivery. An ingenious calculator has lately reduced the matter to an exact statement, based on the assumption that not more than five syllables per second can be distinctly uttered and clearly heard. The sound of each syllable has thus one-fifth of a second in which to reach the reflecting surface and to be returned by the echo, before the next syllable is pronounced. Taking the velocity of a sound at 1120 feet per second, the syllable can make a round trip of 224 feet in the one-fifth of a second which is allowed it; and the reflecting surface must therefore be at half that distance, or 112 feet. For obvious reasons, however, the combined effort of articulation and attention in such minute subdivisions of a second is scarcely possible in practice. The rule would seem to be more satisfactorily tested by the utterance in one second of five syllables in succession, followed by a pause of equal length. If the echo is 500 feet distant, the first syllable of the five will then return just as the last one has been spoken; and the last one will arrive just before the first of the next series starts upon its journey.

USEFUL INVENTIONS.—Among the recent experimental novelties brought forward are what are termed heat indicators, consisting of thermometers encased and protected by iron tubes provided with platinum wires, and connected to a system of electrical bells and indicators on a vessel's deck, by this means preventing spontaneous combustion in a ship's cargo. The effect of this arrangement, as claimed, is that in case of any undue heat arising in any part of the cargo, the mercury in the thermometers will go up, make contact with the platinum wire, and give an instantaneous alarm on deck, indicating at the same time the exact spot where the heat exists.

Another practical invention in this line is an article called alterion, for preventing corrosion in boilers, the interior being coated with this substance, and currents of electricity all passed through the boiler and from time to time reversed, the formation of scale being prevented by a layer of hydrogen gas, deposited on the inner surface of the boiler; the reversed currents reform the hydrogen into pure water, a thin layer of the latter being thus kept all round the boiler.

PECULIARITIES OF IRON.—Add carbon to pure iron and it becomes steel. Add a hydrocarbon to iron, and steel itself becomes so extensively modified that its properties are not recognizable. Thus steel may be as soft as pure iron. Add hydrogen, in varying quantity, and it has the quality of resilience, as in watch spring, or the quality of tenacity, as in the knife or razor, or may be given nearly the hardness of a diamond, as in a file. With steel at a low temperature, from 400° to 450° F., edge tools are produced, the color in the yellow shades; from 500° to 525° various sorts of springs are produced, color blue; while by heating iron to whiteness and plunging it into water, which is mainly composed of hydrogen, files are produced or forms even harder.

SPIDERS.—It is very seldom that any small insect escapes from the web of a spider, a fact which is not to be wondered at when it is considered that an ordinary sized anare may contain as many as 120,000 viscid globules. The spinner is constantly engaged in repairing injuries to the web inflicted by wind, stray leaves or captured insects. Once a day the whole anare is subjected to rigorous examination, and any broken or loosened threads are adjusted.

HOW A FOG MAY CAUSE A FIRE.—Fog does not very often cause a fire, but it has done so in the following manner: Water is nearly as good a conductor of electricity as metal. In a fog or rain, the insulating coating of the wires

becomes soaked with moisture. It is the exception and not the rule for this insulating coating to be perfect. Where the insulation is defective, the current can easily leap from one wire to another, or even from a wire to some other object, and cause flames to burst out. This very thing happens not unfrequently, and fires in cities have been the accompaniment of fog and rains.

CEMENTING IRON GRATING, ETC.—The following mixture has been used with great success for the cementing of iron sailing tops, iron gratings to stoves, etc., with such effect as to resist the blows of a sledge hammer. This mixture is composed of equal parts of sulphur and white lead, with about one-sixth proportion of borax, the three being thoroughly incorporated together, so as to form one homogeneous mass. When the application is to be made of this composition, it is wet with strong sulphuric acid, and a thin layer of it is placed between the two pieces of iron, these being at once pressed together. In five days it will be perfectly dry, all traces of the cement having vanished, and the work having every appearance of welding.

THE LIGHTING FLASH.—Until quite recently, all of the authorities concurred with each other in the opinion that a lightning flash was instantaneous; late experiments show that the flash is not infinitesimal, but that it lasts a measurable period of time. This interesting fact was ascertained by setting a camera in rapid vibration and exposing in it a plate so as to receive the impression of the flash. Upon taking out the plates, it was found that the impressions seemed widened out on the negative, showing that the negative had been moved during the time the flash was in existence.

BOTANICAL GARDENS.—In Europe, there are over 300 botanical gardens, displaying the vegetation of every clime and affording perpetual delight and information to the people. In the United States there is only one—Shaw's garden, at St. Louis. The west has taken the lead of the East here. But the prospect is, that in the course of a few years, New York City will have a magnificent botanical garden at Bronx park, rivaling in time even the royal Kew gardens at London or the Jardin des Plantes at Paris.

NAVAL OBSERVATIONS.—It is stated here that many leading astronomers of the United States are uniting their forces and will memorialize the next Congress to transfer the control of the United States Naval Observatory at Washington, from the Navy Department to the hands of a purely scientific and astronomical board. This is the outgrowth of dissatisfaction among various observatories growing out of the practice of the Naval Observatory of supplying telegraph companies, with time signals for commercial use.

THE ELECTRICAL SAW.—It has been noticed that platinum when placed in an electrical current, is heated to a dull redness. This fact is the basis of the invention of an electrical saw, which will cut quickly and neatly the hardest wood. The device is made of steel wire, upon which is deposited metallic platinum. By connecting this modified wire with the terminals of four Bunsen batteries, the platinum is heated to a bright redness, and the saw is ready for business.

STAR MOTIONS.—The moon revolves around the earth, and the earth, carrying the moon with it, revolves around the sun. Just so in a triple star system we behold one star revolving around another, and the two together revolving around a third. The resemblance goes even further, for the smallest star of the three revolves around the second in size, and that in turn around the largest.

HOW THE STEEL PEN WAS SUGGESTED.—One day, in 1830, when a working jeweler, Joseph Gillott, now the famous steel penmaker, accidentally split one of his fine steel tools, and being suddenly required to sign a receipt, not finding his quill pen at hand, he used the split tool as a ready substitute. This happy accident led to the idea of making pens of steel.

The old telephone wires in London, which were galvanized, and weighed 224 pounds to the mile, are now replaced by silicon bronze, weighing 36 pounds to the mile. It will, however, be interesting to note the results of wet, clinging snow, which usually plays such havoc with overhead wires of all kinds.—*Invention*.

BIRDS.—An American naturalist has made up a list of 210 birds, which are indigenous to Alaska, but also the English sparrow is not among them, and the people of that land cannot be blamed for declaring that the United States has no real sentimental interest in them.

The typical earthquake is preceded by a faint tremor which alarms birds and animals a few seconds before the violent convulsions set in, and which are followed by some longer waves dying away. The real beginning is very indistinct, a fact which still requires explanation.

An electrical expert says no light has been found that will penetrate a fog better than the old oil lamp.

ELECTRICITY.

DAMAGE BY LIGHTNING TO STREET CAR MOTORS.—Much damage has been done to various electrical street-car roads at the East from lightning, and of course very serious apprehensions are always felt by passengers on such roads, when in transit during thunder storms. Until quite recently, no device has been suggested to reduce the liabilities to such danger. The roads in question are run by the trolley system, with overhead wires. A short time since, an accident of this kind occurred, when a portion of the cars were on a down-grade, while others were on an up-grade, and all equally exposed; but the lightning entered only the down-grade cars. Subsequent inquiry, moreover, resulted in bringing out the fact that such was almost or quite invariably the case under such circumstances. The electrical superintendent of the road in question made a thorough inquiry into the reason why the lightning entered the down-grade cars alone. He soon observed that the "A" coil always remains charged, even when the motor is not running. Consequently, when the lightning got upon the trolley wire, it was free to pass down into the motors, and then broke through the insulation and jumped across to the cores. In the cars that were running, this discharge was checked by the high self-induction of the magnet coils, and what small amount could pass through was free to go to earth without injury to the motor. In the cars where the current was shut off, however, there was little of this checking action, and consequently the lightning jumped across to the core and went to the earth. The superintendent in question, who is more than usually ingenious in the matter of repairs, saw the point of the accident at once, and promptly changed the connections so that the "A" coil should not be charged when the motor is not in action, but should be cut off at the switch-box. Since that time the blue has not been struck, so that the efficiency of this arrangement has not been tested, but the arrangement certainly lessens the likelihood of damage to the motors. We gather the above particulars from a correspondent of the *Electrical World*.

SOLDERING WATCHES BY ELECTRICITY.—One of the wonders of electric welding is the wide scope in which it can be utilized. One of its most remarkable achievements is the joining of various metals which have hitherto defied the attempts to weld them perfectly. By this process brass and zinc can be fused together, and one of the specimens which has attracted a great deal of notice, and which is strikingly suggestive of the possibilities of electric welding is a single bar composed of four metals in equal quantities, namely, brass, German silver, copper and zinc. It is believed that this process may, in course of time, be applied to the welding of shafts for marine engines, and in the meantime it is being used for the most delicate work. It is now found that electricity can be employed in the process of soldering jewelry much cheaper than gas. A great deal of experimenting has been done in this direction, and the results have been to establish the fact that electricity is not only more handy for this purpose, but that the fusion of the metals is so complete that if they are subjected to a strain at any subsequent period they will break at any point rather than at the point of welding. —*Philadelphia Press*.

NEW AND OLD ELECTRIC LAMPS.—Since the electric light has come into such common use, it may be well to know how it affects the eyes. Dr. John H. Payne, a celebrated oculist, says: "Most persons who use the incandescent electric light like a new lamp, because the light is whiter and more brilliant than after the lamp has been in use for two or three weeks. This is wrong. It is this dazzling white light that harms the eye. An old lamp is the best, for in these the light has become changed to a pale yellow, which is the ideal color. Just as in noonday brightness human sight is not so clear and far-reaching as at the yellow sunset, so a new incandescent burner is not so good for the eye as the old one. An old burner, so adjusted and shaded that the light from it does not shine in the face, is the ideal artificial light. An Argand gas burner comes next. The use of the arc light should be confined to street lamps. Some store-keepers still use them, but they are terribly hurtful to the eye. This is because the intensity of the light is constantly changing, and this jumping of the blaze is much worse for the eye than the flicker of the gas-light. I have had occasion to treat a great many people for inflammation of the retina, caused by working by the light of arc lamps."

ELECTRICITY IN WARFARE.—Electricity is destined to play a great part in future warfare both on land and sea. No war ship with any pretension of modern equipment is without an electric plant. The heavy guns, which heretofore required the services of several lusty men to point, are now moved by an electric motor. The gun captain can himself, by moving a small lever located at the back of the gun, point it in any direction desired. The advantage gained is not so much in the fact that the gun can be moved quickly as that it is under the control of one mind. Complexity is giving way to simplicity, and in order to have every part of the ship do its work at the proper instant, the captain ensconced in the conning tower can place himself in communication with

any part of the vessel by means of the telephone. He must know just what every man is doing, and must, in fact, be the brain of the ship, while the electric wires are the nerves. —*Ex*.

DANGER FROM ELECTRIC WIRES.—Much hne and dry is being indulged in with regard to danger from electric wires, but when the matter is carefully inquired into it will be found that nearly all the accidents occur from cases of the most transparent carelessness on the part of either the sufferers themselves or those entrusted with work over them. Time, education, experience and improved devices to avoid the possibility of accidents will soon essentially do away with all danger in this respect; even now, these accidents are greatly magnified, and are in fact far less in proportion than are met with in parallel industries. By the gas consumers' report of Massachusetts for 1890 it appears that 107 persons lost their lives during last year from the effects of gas—more than ten times as many as were killed by electricity. Further comment is unnecessary.

AN IMMENSE DYNAMO.—A dynamo of 10,000-horse power is in process of construction at Deptford Station, London. Some idea of its size can be obtained from the fact that the armature will be 40 feet in diameter, with a shaft 36 inches in diameter. It will be driven at a speed of 60 revolutions a minute by two compound vertical condensing engines of 5000-horse power each.

USEFUL INFORMATION.

ASBESTOS is now used to make complete suits for firemen, it is said. Masks are made of asbestos, which are fireproof, and the heat from the hottest fire is said not to penetrate to the skin. Air is drawn from beneath the mask for breathing, so that the burned or flamed and smoke-laden atmosphere is not inhaled. Aprons and insulated coverings for the entire body are now constructed of asbestos. For domestic use sad-iron holders of asbestos may be bad, and with these the grasp of the iron, however hot it may be, never causes pain or burning. Plumbers welcome asbestos cloth for joint-wiping, and larger holders intended for use by smelters, molders and workers in metal generally are among the most recent uses of this mineral. Asbestos mittens to guard the hands are made for assayers, refiners, etc., and armed with a pair, the artisan or worker can grasp hot irons, crucibles and the like without discomfort. The mittens are sufficiently pliable to permit of small objects being readily poked up and held in the hand wearing them.

EXPORTING BEEF CATTLE.—Every beef animal that leaves the United States has its ear pierced. A fine wire passes through the hole, and attached to the wire is a tiny brass tag, not nearly so large as some of the ear pendents ladies used to wear. Upon the tag is a number and the initials "U. S. A." This shows that the animal has been examined by the United States Government Inspectors and is perfectly sound and healthy, and that even weak-stomached royalties may eat that beef with impunity. The Government deserves great credit for the pains it has taken to warrant the prime condition of American beef cattle. The influence of these thoroughgoing measures is already beginning to react favorably in Europe.

A GREAT many people are interested in knowing how to remove oil marks on wall-paper, where careless people have rested their heads. This may be done by making a paste of cold water and pipe-clay or fuller's earth, and laying it on the stains without rubbing it in; leave it on all night, and in the morning it can be brushed off, and the spot, unless it be a very old one, will have disappeared. If old, renew the application.

SAVING THE WASTE.—S. W. Taylor, says the *Oviedo Chronicle*, recently shipped 600 pounds of dried orange peel to a Baltimore firm. It took him about one week to gather this amount, and as he has been offered four cents per pound for it, he considers that he made pretty fair wages by it. The day is coming when the peel, the blossoms, the oulls, will all be utilized in California.

OLD GUNS.—A Belgian gun manufacturer says it is a mystery to him what becomes of all the guns made. They are not perishable or easily destroyed, yet, year after year, the great manufacturers have increased their works until the number of guns and pistols that are made each year is something enormous, and the trade, instead of decreasing, is constantly growing.

A NOVEL INCUBATOR.—D. G. Pitner has now 6000 eggs hatching in his hop-kiln, which he is using as an immense incubator. He is adding more eggs every day, and expects to have 8000 in before the kiln is full. Everything has gone on nicely so far, and the indications are that this novel hatching project will be a success. —*Sutter Independent*.

THE WEALTH OF THE UNITED STATES was assessed at nearly \$50,000,000,000 in 1880 and had nearly tripled in 20 years. Its actual aggregate in 1891 is probably very near to twice the great sum named.

GOOD HEALTH.

The Orange Cure.

The orange cure is not unlike the famous grape cure practiced in some parts of Germany. Oranges should be free as water. You take two or three, at least, before breakfast; and after breakfast, as you saunter out in the grove, you sample two or three more of the different varieties. There are always more or less of "drops." The juice contains the main curative principle. As with grapes, you must avoid seeds and skins; so with oranges. The more Navel the better, destitute of seeds and filled to the bursting with the rich orangeade. One reason why we would recommend the Navel is that you can regard the skin as a kind of cap, and drink your generous glass full of the pure juice even from one orange. We have often seen a Navel that would weigh a pound. A large orange of other varieties is liable to be coarse, and, having a coarse-grained pulp, which is not palatable but comparatively dry, so that you must cut several such oranges to obtain the amount of the healing juice that you get from the Navel; the latter, too, has a finer flavor than the large oranges of other species. On the whole, we give the preference to the Navel for all the purposes for which an orange is grown, and particularly in our orange cure.

"What will it cure?" Well, we have mentioned dyspepsia, but this has almost numberless manifestations and symptoms, and often is at the basis of coughs, bronchitis, liver trouble, kidney trouble, heart trouble, and is almost certain to involve one or more of these vital organs. Get the stomach and liver right in the way indicated and the kidneys will soon be healthy. The blood comes pure, the lungs work normally, the nerves tone up; headaches, backaches and neuralgia even pass off. The orange juice acts very directly to benefit the liver and all the disorders that may infect the alimentary canal. —*Exchange*.

HYGIENIC BREATHING.—The many systems of physical culture now practiced unite in a recommendation of slow and deep breathing, and of a frequent practice of taking long breaths, which will force the air into all the lung cells. One physician says that six breaths a minute make a profitable average. Women especially are inclined to take many short breaths a minute, and exhaust their force in rapid and imperfect lung expansion. There exists a difference of opinion among the best authorities in regard to the best manner of breathing, some recommending abdominal and some chest breathing for women. "Breathe from the diaphragm" is a rule given by one leader of a system of physical culture. In a paper read before a woman's club in New York, a novel exercise was mentioned. It was that of drawing deep breaths and walking very rapidly at the same time. The speaker said: "I draw a deep breath, walking very rapidly when I have filled my lungs, and I do not take another until I have reached a certain point in the block. The result is exactly as if I had been running hard. My blood tingles all over me and I seem to have brought every nerve and muscle into active play." There are many "breathing exercises," one of the best of which is that of taking a deep breath and swallowing the air, first one and then the other, and finally both while the breath is inhaled. The exercises which expand the chest are among the best offered by systems of physical culture, and their practice to-day by so many women, especially in Boston, is an encouraging promise of health for the mature as well as the young. —*Boston Journal*.

PINEAPPLE JUICE FOR DIPHTHERIA.—"Nature has her own remedy for diphtheria," says a Chicago man. "It is nothing more nor less than pineapple juice. I declare that I have found it to be a specific. It will cure the worst case that ever mortal flesh was afflicted with. I did not discover the remedy. The colored people of the South did that. Two years ago I was engaged in lumbering in Mississippi. One of my children was down with diphtheria, and the question of his death was simply the problem of a few hours to determine. An old colored man, to whom my wife had shown some kindnesses, called at the house and, saying he had heard of my little one's illness, urged me to try pineapple juice. The old fellow declared that in Louisiana, where he came from, he had seen it tried a million times, and that in each case it had proved effective. So I secured a pineapple and squeezed out the juice. After awhile we got some of it down the boy's throat, and in a short time he was cured. The pineapple should be thoroughly ripe. The juice is of so corrosive a nature that it will eat out the diphtheritic mucus. I tell you it is a sure cure." —*New York Tribune*.

ORANGE BLOSSOMS FOR CHILDREN'S AILMENTS.—Peter Arlmond informs the *Anahelm Gazette* that a tea made from orange blossoms is a good preventive of all the ailments of children, and is also a great invigorant for older people. It is not necessary to gather the blossoms from the tree, but when the fruit sets, the ground will be found to be white with the fallen petals. These are gathered by spreading a cloth for them under the trees. The petals may be dried and preserved indefinitely, but in the green state are also efficacious in warding off disease. Mr. Arlmond states that this tea

will greatly alleviate or do away with the ailments and disorders usually experienced by children and save thousands of dollars in doctors' bills. It is certainly a very simple remedy and easily attainable in California, and might prove valuable. We should be pleased to hear of any good results that might be received from such use.

STEAM BOILER NOTES

Efficiency of Steam Jackets.

The question of steam jackets is getting to be quite a vexed question of engineering. Experience shows that in some instances the steam jacket appears to effect an important saving, while in others no important gain is observable. Exactly what are the conditions under which it may be most profitably employed have never been very clearly shown. Evidently more definite literature or experience is needed in this direction. Perhaps the following brief hints upon this subject by an English engineer, Bryan Donkin, may be of some service to engineers in this direction:

When we consider how easily steam jackets are misunderstood, and how often misapplied by making them into air or water jackets, an inquiry may be expected to reveal a great variety of results, and much want of uniformity. Few people fix a steam-gauge on their jackets to check the pressures and temperatures, and to ascertain whether the steam supply to the jackets is large enough. A cook at the highest and lowest points of the jacket should also not be omitted, to test for steam or water.

The "quality" or dryness fraction of the steam used in the engine has no doubt a considerable influence, but unfortunately there is much difficulty in testing the steam, since no reliable instrument at a moderate price has been offered to the public.

Further, there is the important question of the temperature of the cylinder walls, and of all the internal parts exposed to the working steam. All these have a marked effect. These walls should be kept generally at the highest temperature available, and certainly hotter than the initial steam. With the same quality of steam, and with walls at two different temperatures, the hotter wall will doubtless yield the most economical results. Where the walls are of the same temperature, and working with steam of different qualities, the drier the steam the better will be the result. My experiments show that the temperatures of cylinder walls are some 30° F. hotter with steam in the jacket than without. An economy of 31 per cent, due to the jacket, was obtained with a small, fast-running, single-cylinder, condensing, vertical engine. For every pound of water deposited in the jackets, about five pounds were economized in the cylinder.

With vertical cylinders, it is not difficult to divide the barrel jacket water into two parts, and collect the water separately from the two vertical cylindrical surfaces of the jacket space—that is, from the inner and the outer surface. It is only the former which represents the useful heat going through the metal walls and keeping them hot; the latter shows simply the loss due to useless radiation, which should be reduced to a minimum.

BANKING FIRES.—The fire in a boiler was banked over night, and during one evening a considerable portion of the water leaked out. In the morning the fireman stirred up his fire and then noticed there was no water in sight, and considerably frightened, he drew the fires and waited for the engineer, not daring to put in water. The engineer did not get excited, but took a place of waste, wet it well, put it on the end of a poker and rubbed it over the boiler plates and appeared satisfied. "What do you do that for?" inquired the fireman, and from the engineer's reply he gathered that if the plates were overheated, the water left by the wet place of waste would show it by quickly evaporating, but if they were not overheated the water would remain on the plates. From this little test he satisfied himself that it was safe enough to fill up the boiler.

DON'T FORCE YOUR BOILER.—One very important cause of deterioration in boilers is due to the fact of their becoming too small to do the work without forcing, so that the pulsations of the engine cause a well marked succession of shocks on the boiler, which result in the weakening of the material. By placing one's hand on the head or shell of the boiler, the vibrations of the metal can be felt, similar to the rising and falling of a man's chest while breathing.

GRATE SURFACE.—If the grate surface under a boiler is larger than is necessary to burn the required amount of coal, it is neither economy, convenience, nor good judgment to retain the full surface, as better results, with less labor and more economy in fuel, would be obtained by shortening the grates to such an extent that from eight inches to twelve inches of fire would be required at all times.

FIRING BOILERS.—Those who think it is nothing to fire a boiler, should undertake it sometime on a boiler hard pushed to supply efficient steam, with burning screenings or similar fuel. It is one thing to fire with good, clean Cumberland, but quite another job to use the less valuable or free-burning fuels.



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SAN FRANCISCO:

Saturday, May 9, 1891.

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[NEW THIS ISSUE.]

Gre Tests and Treatment—Grass Valley Gold Extracting Company, Holms Station, Grass Valley.
Dividend Notice—Pacific Coast Borax Company.

See Advertising Columns.

Passing Events.

The fact that the iron molders of this city who have been on continuous strike for the past 14 months, have at last asked the foundrymen to arbitrate with them on the differences, is taken as an indication that they are tired of the contest. The foundrymen have declined to arbitrate with the Molders' Union, as they do not wish that body to dictate as to employees in the shops.

Another large mining company, this time at Coeur d'Alene, Idaho, has adopted electricity as a motive-power for mill, hoist, pumps, compressors, etc., and expects to save 50 per cent over cost of steam-power. A good many other companies on this coast would do well to look into this subject with a view to economy in working expenses.

The mines on the Northwest coast in Oregon, Washington, and in British Columbia, are receiving more attention than ever before, and capital is coming to the assistance of the miners. There is a large area of unprospected country in the region referred to.

Reports from the Deep Creek country, Utah, continue favorable, and something like a "boom" is in progress. Judging from the reports in the Salt Lake papers, the district has a great future.

Rock Blasting by Electricity.

Rock blasting by electricity is acknowledged to be the most effectual, as a large number of holes can be exploded simultaneously, and better execution obtained from the powder than if the holes are fired independently. No time is lost waiting for smoke and fumes of several blasts to pass away. In case of a misfire, the advantage of electric firing is still more evident since, if the charges are not all simultaneously exploded, there can be no possibility of its exploding afterward; therefore there can be no danger in approaching the face at once to discover the cause. In subterranean work and very wet shafts electric blasting is indispensable, as the charge can remain several hours, even days, in water before firing, without deteriorating, thus giving time to complete the loading of holes, and to make the necessary preparations before exploding the charge.

It is a fact to be regretted that the majority of blasters who use electric appliances know little, or perhaps nothing, about the principle of electricity. It might, therefore, seem almost impossible that success should attend their efforts. In theory, this may be so; but in practice the blasters can often outdo the electricians in preparing and firing the blast. Very little has, however, been published to enlighten blasters in the use of electric appliances, but a recent catalogue by James Macbeth & Co. of New York, manufacturers of electric blasting appliances, contains considerable information on this point.

One of the cuts (see page 289) represents clearly the manner of connecting holes for firing by electricity. A is the hole in the rock; B, dynamite charge in hole; C, electric fuses in dynamite charge; D, connecting wire joining fuse wires together; E, leading wire from battery to fuse wires; F, electric-blasting machine or battery. This method is called "connecting in series," and is the system universally adopted in this country. The electric-fuse wire should be about the same length as the hole is deep; better to have the wire a little longer, that it may project above the surface of the hole after it is tamped, for the purpose of connecting it to the wire of the next hole.

Care should be taken when tamping the holes, not to injure or cut the insulation on the wires, as bare portions of the wire or bare joints should never be allowed to touch the ground; particularly so if the ground is wet. After the holes are tamped and made ready to connect for firing, take and separate the ends of the two wires in the first hole, leaving the outside wire for connecting with the leading or battery wire; then join the inside wire of the first fuse to the nearest wire of the second fuse; then the other wire of the second fuse to one of the wires of the third fuse, and so on until all fuse wires are connected. Then take the outside fuse wires of the two outside or end holes, and join them to the leading wire which goes to the binding posts of the battery, and fasten there by means of a thumb-screw.

If the holes are far apart, use connecting wire for joining fuse wires together. This connecting wire should be of the same diameter or size as the fuse wire. The leading wire should be at least twice as thick. Special care must be taken when making joints for connecting wires together, to have the ends clean and bright, and free from dirt or grease; this can be done by scraping them with a knife. After all bare connections are made, they should be covered with the special tape insulation, which can be applied instantly. The heat of the hand will cause it to stick fast and make a thoroughly waterproof joint.

Many blasts have failed by allowing bare connections to come in contact with the ground. The earth being a conductor of electricity, and offering less resistance, draws the current from the fuse wires. Batteries should be a safe distance from the blast—usually about 300 to 500 feet. All workmen should be at a safe distance before operating the battery to fire the charge. An important matter which is seldom thought of by blasters, is to examine the leading wire, to see that there are no cracks or breaks in it. Even new lengths of leading wire may be defective. It has been found so in long lengths, where the ends are held together or joined only by a heavy cotton braiding, which prevented the current from passing.

Another illustration represents the usual way of making joints. First cross the ends of

the wire, as shown in cut A, then twist the ends, as shown in cut B, being particular to twist close and tight, as a slack joint or twist is not a good connection. Be sure to have the ends clean and bright. Keep bare joints off the ground.

Few people stop to consider the position which an electric fuse occupies in electric blasting. It is the essential article in that system, and should be selected with great care and caution, for without a reliable fuse labor and material are lost. It is inserted in the dynamite charge, and is exploded by means of an electric current, generated by the blasting machine or battery. The electric current, passing through the wires, heats the platinum bridge in the fuse and explodes it, the explosion or concussion of which fires the dynamite in the whole. The Victor electric fuses here-with illustrated are made of single and double strength as desired. The copper sheet or cap contains a very sharp and powerful explosive, about double the strength of the best blasting caps. The system of soldering the platinum ends is done with a special automatic machine, insuring uniformity, and securing the miscellaneous explosion of each fuse, which is most essential.

The joint insulation tape is a very useful and convenient article for covering bare wire joints in blasting, either on dry ground or under water. Its composition is konite; a superior insulating compound. It makes a perfectly and thoroughly waterproof joint, and can be applied instantly. The heat of the hand will cause it to stick fast to the bare wire and it cannot be removed, except by cutting it off. It is put in half-pound packages, in widths of $\frac{1}{2}$ and $\frac{3}{4}$ inches. It costs but a trifle, and should be generally used by all blasters for covering bare connections.

The "Pull Up" magneto blasting machines are specially constructed to meet the requirements of those who desire to fire a large number of shots at one time. The operating device is quite simple. The hinged iron plates on the bottom of the box are made to stand upon with the feet; then by pulling up on the bar with one continuous stroke with both hands, the blast will take place. After firing, the bar will drop back into place ready for use again. One of the cuts shows a machine connected with a small electric lamp for testing the condition of the battery. The lamp will tell the miner the condition of the battery. By connecting the wires of the lamp with the battery, and operating the latter as if firing a blast, the lamp will show an incandescent light, or a white flash if the current is very strong. If the current is weak, it will only slightly redden the fiber on the glass bulb. If the battery does not even redden the fiber of the lamp, the battery is not in good order and will not fire a blast.

The "standard" tester, shown on this page, will tell the miner if the fuses, cones, connections, joints, or even the entire blast are right or not. The machine is intended to test the electric fuses or exploders before placing them in the charge holes to blast, to make sure they are perfect. To make doubly sure with the same machine, the entire charge can be tested before putting the leading wire to the battery. The connection being properly made, the ringing of a little bell in the tester proves whether everything is all right or not.

In electric blasting, leading wire forms a very important part, and great care should be taken to have it in good condition and in a convenient form to use. The Victor reel is a simple and practical device to keep the leading wire on; it is strong and durable, and handy to carry about. It is the only reel made, whereby there can be a continuous wire from the battery to the blast—both wires are separated on the reel and can be run off in any required length. The Victor reel will hold over 1000 feet of wire, 500 feet on each, and 5 to 10 feet in the middle to reach to the battery.

The Victor connecting-wire holder is a simple device, which will be found very useful and handy for carrying connecting wire to the blast. When connecting the holes, or when not in use, it can be set upon the ground without danger of having the spool or wire get wet or dirty, it will also prevent snarling or kinking of the wire when cutting off the quantity desired. It will also be found convenient in the shop or store. It is arranged to hold two spools, weighing two to five pounds each.

The Cruiser Monterey.

(Continued from page 289.)

The propelling engines are of the triple expansion type, 30 inches stroke, the high-pressure cylinder being 27 inches, the intermediate 41 inches, and the low-pressure 64 inches in diameter, which, with the vacuum, etc., are expected to develop, with steam pressure at 160 pounds per square inch and 150 revolutions per minute, 5400-horse power. There are two main boilers, made of steel, 11 feet 2 inches in diameter, with a length of 10 feet 7 inches, with four other tubular boilers in addition, and all designed for a pressure of 160 pounds.

The armament of the vessel is to be as follows: Two 12-inch breech-loading rifled guns with 13-inch steel armor protection; shield 8 inches thick; projectile weighing 850 pounds; powder charge 425 pounds; two 10-inch breech-loading rifles mounted on barbette, with 11 $\frac{1}{2}$ -inch steel armor protection; steel shields $7\frac{1}{2}$ inches in thickness; projectile weighing 500 pounds and powder charge 250 pounds.

There are to be also 54 six-pound rapid-firing rifles; four 37-millimeter Hotchkiss revolving cannon and two one-pound rapid-firing rifles. In addition to the above armament, she will have a 15-inch pneumatic dynamite gun, which will throw 1000-pound projectiles containing 500 pounds of dynamite or other high explosives.

The Monterey is the first ship of the United States Navy fitted with the Ward sectional boilers. They were found after exhaustive trials and experiments by the Navy Department to be the best type adapted for use on coast defense vessels. Much of their merit lies in the small space they occupy, together with speedy steam generation, economic consumption of fuel and the easy manner with which repairs can be made in case of accident.

The engines, boilers, and magazines, in fact all the machinery will be well protected by armor, 16 inches in thickness, rendering their safety almost certain from the inroads of hostile projectiles.

It will easily be seen that with the completion of "Cruiser No. 6," the "Oregon" and the double turreted monitor, "Monadnock," together with those already built and in commission, San Francisco will soon be able to turn out a fleet of war vessels, well able to protect herself and the California coast.

Exhibit of California Tin.

The exhibit of stanniferous ores and their metallo products from the mines of the San Jacinto estate, made in this city during the past week, attracted great attention. The show-rooms on Market street where the display was made have been constantly surrounded with a curious crowd. The exhibit referred to consisted of about two tons of commercial ingots of pure tin, each weighing about 65 pounds, with a great variety of smaller bars all bearing the company's brand, "Temescal." There were also blocks and stannite figures draped in rolls of pure white, of a silvery luster and of various gaudy colors; masses of dark brown ore liberally sprinkled with the yellow tin oxide, and such other products as tin ore and metal might show.

There was also exhibited as a product of this San Bernardino county estate, the ores of gold, silver, cobalt, nickel and copper, coal and fire clay. Numerous photographs were shown of the works at Cajalco, etc. One of these was taken at the time of President Harrison's reception at South Riverside, where a 20-foot pyramid of tin ingots was shown him. The President is seen standing at the base of this pyramid. The whole exhibit of this new industry of the State was very instructive.

TECHNICAL SOCIETY.—At a meeting of the Technical Society of the Pacific Coast, held in the California Academy of Sciences building, R. Hinoholiffe, consulting engineer of the Pacific Iron Works, read a comprehensive paper on the Hall hydro-steam elevator. F. Gutzkow had on exhibition an improved injector for raising liquids, especially acids.

The California Electric Academy will shortly move into room 52 of the Academy of Sciences building on Market street.

PART of the articles recently stolen from the State Mining Bureau have been recovered.

Thinolite Crystals.

In an engraving of thinolite crystals on this page, an interesting study is presented of some of the forms of deposition that have taken place in ancient times in the beds of Pyramid, Bonneville, Mono and Lahontan lakes, and in their successive layers alternating with the cone and crag-like masses of tufa deposited from the waters of sublacustral springs.

These deposits, layers and crystals, following each other in long periods of time, are read by our geologists, like the pages of an ancient

book, presenting many physical facts that enlighten the study of some of the formations composing the crust of the earth.

Thinolite is considered as an alteration of crystals, the original forms of which have been preserved, while their chemical composition has changed.

The name thinolite was first applied to this mineral by Clarence King in his Report of the U. S. Geological Exploration of the 40th Parallel (Vol. I, p. 508), in which Lake Lahontan was first described.

What the original altitude of the highest of the ancient beaches of Mono lake in Mono valley may have been it is now impossible to determine with accuracy. Considering the elevations surrounding the lake the maximum

height of the ancient beach above the surface of the water, and adding to this the present depth of Lake Mono, but not considering the amount of recent sedimentation that has taken place, we have 827 feet as, approximately, the maximum depth of the lake at the time the highest of the ancient beaches was formed.

Figs. 1 and 2 of the engravings represent thinolite from Lake Mono, California, (natural size) showing the grouping of the composite crystals.

Fig. 3.—Thinolite from Lake Mono (natural size), fragment of a large composite crystal, hansen crystals; compare with Fig. 12.

Fig. 10.—Thinolite crystal (natural size), showing cap-in-cap pyramidal structure similar to Figs. 27 and 28 (deposited in Lake Lahontan).

Fig. 11.—Thinolite crystal (magnified four times), showing resemblance in form to the Sangerhausen pseudomorphs; compare with Fig. 12 (deposited in Lake Lahontan).

Fig. 12.—Single Sangerhausen crystal, showing form and external markings (magnified twice).

Fig. 13.—Group of small thinolite crystals deposited in Lake Lahontan (magnified four times); compare with Fig. 8.

Figs. 14 and 15.—Transverse sections (nat-

Fig. 19.—Square pyramidal crystal (reduced one-half) which gave at the point indicated, the section Fig. 24; the surface has been made smooth by subsequent deposition of CaCO_3 (deposited in Lake Lahontan).

Figs. 20 and 21.—Skeleton crystals, (natural size) showing cap-in-cap structure, and thus revealing the line square pyramidal form of the original mineral. (deposited in Lake Lahontan).

Fig. 22.—Crystals (natural size) from the Domea, Pyramid Lake; the surface smoothed over by subsequent depositions of CaCO_3 , with sprutings from the edges and extremities.

Fig. 23.—Section (magnified eight times) of a crystal from the Domea, like that in Fig. 22, showing a diagonal and rectangular framework, partly crystalline, granular, partly amorphous, with layers of secondary carbonate opal like in structure.

Fig. 24.—Section (natural size) of the crystals shown in Fig. 19 cut transversely at point indicated; it shows the same framework of granular crystalline carbonate, partially filled in with secondary CaCO_3 .

Fig. 25.—Section (natural size) showing the usual framework partially filled in with secondary CaCO_3 and with encosive layers also around the outside (deposited in Lake Lahontan).

Fig. 26.—Section of a crystal from the Marble Butte, Nevada (magnified eight times), and showing the structure lines of crystallized carbonate, and also in the cavities the acicular crystals of aragonite (?) (deposited in Lake Lahontan).

Figs. 27 and 28.—Small pyramidal crystals (natural size) showing by dissection the cap-in-cap structure, and thus like Figs. 20 and 21, revealing the true pyramidal form of the original mineral (deposited in Lake Lahontan).

Arbitration with Molders Declined.

When the Molders' strike commenced in this city some 14 months ago, the foundrymen were anxious to arbitrate the differences, but the molders declined, so the contest went on. Meantime, however, the foundries have been supplied with men and the Union molders have been idle. This week a proposition to arbitrate has come from the molders and has been declined by the foundrymen, as the following correspondence shows:

Iron Molders Union, No. 164.

SAN FRANCISCO (Cal.), May 1, 1891.—To the Engineers and Iron-founders' Association of San Francisco, Cal.—GENTLEMEN: Finding that the time has come when steps should be taken by the parties directly interested to bring the trouble which has existed for the past 14 months between your association and this Union to a termination, we would respectfully ask that a committee be appointed from your association to confer with a like committee from this Union to arrange for an arbitration of all differences between the two bodies and the members thereof.

Trusting your association will give this matter due consideration and that a favorable reply will follow, I am, yours respectfully,

JOHN S. COLLINS.

SAN FRANCISCO (Cal.), May 6, 1891.—To the Iron-molders' Union, No. 164, San Francisco.—GENTLEMEN: In reply to your favor of May 1st, we beg to state that before the strike took place and at the beginning of it we were very desirous of arbitrating matters of difference between members of this association and your Union, but our overtures were declined on the ground that the questions involved were beyond the jurisdiction of your local body. Consequently we were compelled to seek molders elsewhere. Now, 14 months after you voluntarily left our employ, you express a desire to arbitrate differences.

We understand the question of arbitration to mean that when two or more parties who have differences to adjust are desirous of settling them in an amicable and friendly manner they select disinterested persons to pass upon the questions involved, so that a settlement may be had in a speedy manner satisfactory to all the parties concerned, and that was our desire when we first proposed arbitration.

Now, all business relations between the members of this association and the members of your Union having been voluntarily severed by you, there are no differences between us which could be adjusted by arbitration.

However, we desire to say that we have no quarrel with your Union. Your members can obtain employment in our shops whenever we have work to do. We are not fighting your Union, and do not intend to. On the other hand, we believe that, as employers, we have the right to make the rules which govern our shops, and if these rules are too onerous for any one in our employ they have a perfect right to leave us and seek employment elsewhere. We also believe that any American citizen has a right to earn a living, and that every California boy has a right to learn a trade and become of use to society and not a drone.

We also think that California should in the past have received the same consideration from the molders that is granted to foundries in other parts of the United States. All we ever asked was that we should be placed upon the same footing as foundries in the East; that is to say, "open" shops.

We will under no consideration, now or at any time in the future, arbitrate or discuss in any way the question of discharging the men and boys now in our employ. If you desire to settle the strike, you can instruct your members to apply for work. We know of no other question to settle. Hereafter if differences arise between us and the men in our employ we shall be perfectly willing to submit such differences to the arbitration of disinterested persons. Respectfully yours,

ENGINEERS AND IRON-FOUNDERS' ASSOCIATION OF CALIFORNIA.

IRA P. RANKIN, President,
By R. S. MOORE, Secy.

FORMS OF CRYSTALS IN THINOLITE.

made up of small acicular crystals in parallel position.

Fig. 4.—Transverse section of the crystal represented in Fig. 3, showing the same skeleton structure distinct in crystals, deposited in Lake Lahontan, from Pyramid lake, Nevada, (Figs. 14, 15, etc.).

Figs. 5 and 6.—Group of thinolite crystals from Lake Mono (natural size), showing the acicular form, and also the way in which the crystals are coated over with the secondary carbonate.

Fig. 7.—Group of small crystals (magnified four times), from Lake Mono, showing the same method of grouping common in the Sangerhausen pseudomorphs, as shown in Fig. 8.

Fig. 8.—Group of Sangerhausen pseudomorphs (natural size); compare Fig. 7.

Fig. 9.—Isolated thinolite crystals deposited in Lake Lahontan (magnified twice), showing resemblance in form and making to Sanger-

hausen crystals; compare with Fig. 12.

Fig. 10.—Thinolite crystal (natural size), showing cap-in-cap pyramidal structure similar to Figs. 27 and 28 (deposited in Lake Lahontan).

Fig. 11.—Thinolite crystal (magnified four times), showing resemblance in form to the Sangerhausen pseudomorphs; compare with Fig. 12 (deposited in Lake Lahontan).

Fig. 12.—Single Sangerhausen crystal, showing form and external markings (magnified twice).

Fig. 13.—Group of small thinolite crystals deposited in Lake Lahontan (magnified four times); compare with Fig. 8.

Figs. 14 and 15.—Transverse sections (nat-

book, presenting many physical facts that enlighten the study of some of the formations composing the crust of the earth.

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What the original altitude of the highest of the ancient beaches of Mono lake in Mono valley may have been it is now impossible to determine with accuracy. Considering the elevations surrounding the lake the maximum

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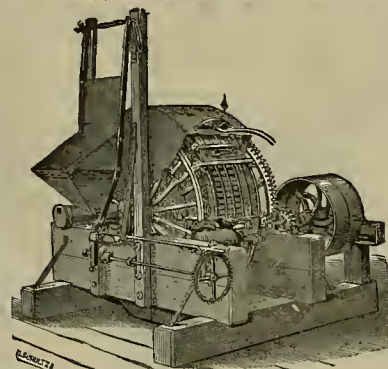
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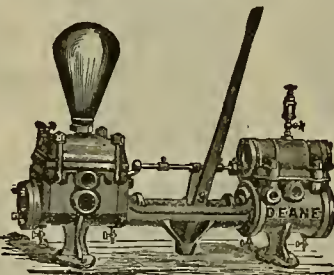
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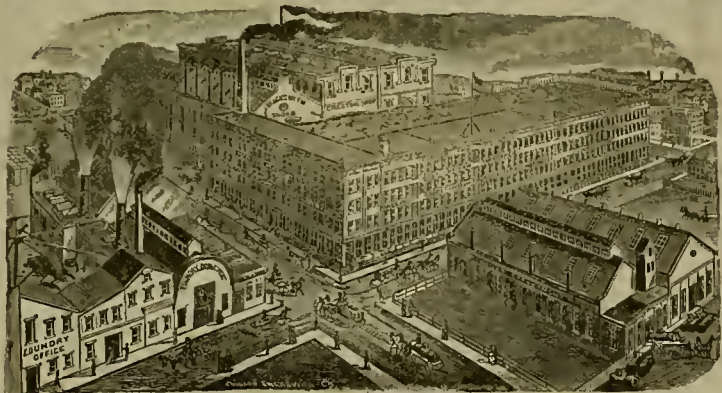
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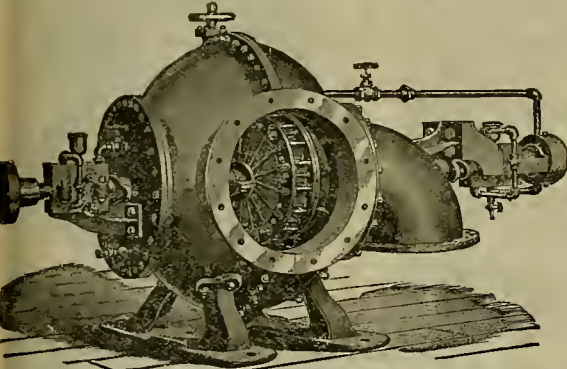
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, May 7, 1891.

Mineral trade continues fair. Crop advices are taken as a whole, favorable for a larger outturn of wheat than has been for many years past. Southern counties that were the hanner producers last year, will give way to Colusa and other counties in the Sacramento valley. The acreage this year is over 1,000,000 in excess of that of 1890. The money market is easy, but a large demand is looked for soon, which will continue well into the fall months. Among manufacturers there is a cheerful, buoyant feeling.

MEXICAN DOLLARS—The market shows more strength, with dealers asking an advance. Quotations are given at 78 1/2 @ 79c.

QUICKSILVER—Receipts the past week aggregate 380 flasks. The market is unsettled, with quotations ranging from \$43 to \$45.

SILVER—Department purchases so far in this month are reported as follows:

Date.	Oz. Offered.	Oz. Bought.	Price Per Oz.
May 1.....	739,000	350,000	\$.9760 to \$.9840
May 4.....	326,000	326,000	\$.9850 to \$.9870

With the government resuming monthly purchases of silver, the market shows more strength. To the failure in last March of a large financial firm in India and the unsettled conditions of affairs between European Governments are traceable much of the depression in the silver markets abroad. We still maintain that before the fall months pass, a much higher range of prices will be witnessed in this country and Europe. This assertion is based on the statistical position of the metal and an undoubted large demand for India to meet wheat purchases. The higher prices ruling for wheat, calls for more silver in which to make payments. Everything in the United States points to either the re-monetizing of silver, or else to more favorable legislation, and this, too, soon after Congress meets in next December.

BORAX—The market is fairly steady at full prices.

LIME—Receipts the past week aggregate 5678 bbls. The market is fairly strong, with a good home and export demand ruling.

LEAD—A consignment of 494 pigs came to hand the past week from London, England. The market is said to be in the same unsatisfactory condition heretofore reported.

TIN—The consumption of tin is quite large, but the stock here and to arrive is largely in excess of this year's requirements. Oregon and this State will take increased quantities for fruit canning. At the East, a promised large fruit crop, if realized, will demand increased quantities of plate.

COPPER—Markets throughout the world are bearish. Consumers appear to restrict their wants. European money markets and political complications are against holders.

IRON—The market is reported essentially unchanged. Shotts No. 1 is again in market. Cargo fleet is selling at \$27 per ton spot.

COAL—Imports the past week aggregate as follows: Nainaimo 4904 tons; Newcastle, N. S. W., 4315; Sydney, 2315; Glasgow, 2333; Tacoma, 2000; Departure Bay, 2400; Seattle, 2300. Total 20,567 tons. The market shows a steadier tone. There is a growing impression that no lower prices will rule for sometime, and perhaps not this year. The consumption for steam purposes is not only very large, but promises to increase in the near future. After Australia markets her wheat surplus, vessels from there will be offering more freely for coal loading for this port to take advantage of our large crop of wheat. The consumption of domestic coals up north is very heavy.

Coal and Coke.

SPOT FROM YARD—PER TON.	TO LOAD—PER TON.
Wellington.....\$10 00	Australian.....\$ 7 00 @
Greta.....8 50	Liverpool Stm.....7 00 @
Carbon Hill.....8 00	Scotch Splint.....7 00 @ 9 00
Nainaimo.....10 00	Cardiff.....7 00 @
Gilman.....7 50	Lehigh Lump.....14 00 @ 17 00
Scotch Splint.....7 50	Cumberland bk 10 00 @
Ocean Bay.....9 00	Egg, hard.....12 00 @
Canell.....9 50	West Hartley.....7 50 @
Egg, hard.....16 00	
Cumberland, in sacks 14 00	
do, bulk.....13 00	
Wallend.....9 00	Coke—English.....
Scotch Splint.....9 00	
Rymbo.....9 00	To load.....\$12 00 @ 13 00
West Hartley.....9 00	Spot, in bulk.....16 00 @ 18 00

Eastern Metal Markets.

By Telegraph.

New York, May 7.—The following are the closing prices the past week:

Silver in Silver	London.	New York.	Copper.	Lead.	Tin.
Thursday.....	9 1/2	13 75	4 20	19 65	
Friday.....	9 1/2	13 75	4 22 1/2	19 80	
Saturday.....	9 1/2	13 75	4 22 1/2	19 85	
Sunday.....	9 1/2	13 75	4 22 1/2	19 95	
Monday.....	9 1/2	13 75	4 22 1/2	20 05	
Tuesday.....	9 1/2	13 75	4 22 1/2	20 05	
Wednesday.....	9 1/2	13 75	4 22 1/2	20 00	

Of Borax there is a light supply, California being wanted at \$4c for concentrated and \$3c for refined and powdered in car lots. Quicksilver is quiet and easier. Tin is stronger, as is Lead. Copper continues easy and unsatisfactory in holders. Iron is reported firmer.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

BRICKS RANCH M. Co., May 4. Capital stock \$1,000,000. Directors—C. S. Shattuck, H. O. Greenhood, Hartley Williams, Calvin W. Kellogg and J. Dewing.

CALIFORNIA AND WASHINGTON INVESTMENT Co., May 4. Capital stock \$1,000,000. Directors—H. C. Barrow, C. E. Mayne, N. R. Gregory, J. E. Shepard, Geo. A. Turner and E. B. Barrow.

EDISON S. M. Co., May 6. Capital stock \$500,000. Directors—L. Glass, J. Wolff, B. W. Bates, M. Jones and F. E. Luty.

Mining Share Market.

Mining shares the past week showed continued activity at steady advancing prices up to Tuesday for Con. Virginia and its satellites, but shares in the Middle and Gold Hill mines did not appreciate much. On Tuesday afternoon the Middle stocks began to harden, and gathered more strength the next day which resulted, in the afternoon of yesterday (Wednesday), in quite an advance. In this up move the Gold Hill stocks sympathized, with Overman exhibiting the most vitality. The advance in Con. Virginia from \$6.37 1/2 a share on March 6th to \$20.50 on May 5th, has been effected so quietly, and in such a mysterious way as not to attract much attention. Toward the close some of the commission brokers report an increase in Con. Virginia shares held by them, but no increase in other stocks. This seemingly indicates that the pool is selling the former at present prices, and why not, for there is a good profit in sight. At \$20 a share the aggregate value of the mine is over \$4,000,000. This is a good round sum, when it is considered that in the forepart of January of this year the shares sold below \$2.50 which made the mine aggregate in value in that month less than \$500,000, and no more ore is in sight now than was known to be by the pool at that time. While other stocks have not advanced proportionately as did Con. Virginia, yet on an average their shares are selling now for fully three times more than they did the latter part of December 1890. Mining shares are not only higher now, but it looks as if they will go still higher, so as to allow the pool to unload at a good round profit, then look out for the old story—a good break and nearly all outsiders financially hurt, if not ruined. Persons who play at other persons games have only themselves to blame, and can not enlist the sympathies of those who are strong minded enough to let insiders, for the want of other prey, feed on each other. The work going on in the mines is of a still more exciting character, and dealers can prepare themselves for strikes and higher assays in the near future, provided they can not peddle out the stocks, without resorting to big hull stories or measures. In outside shares trading has been and continues light. It looks as if they are being concentrated for the usual summer bull campaign.

The market opened this (Thursday) morning quite active, with considerable more trading in Middle and Gold Hill stocks. After call, the prices shaded off under heavy sales. The market has a healthy look, as if the pool is standing under it preparatory for higher prices than have been reached on this deal.

From the Comstock mines, our advices are of a more encouraging character than has come to hand for some time past, particularly from the Middle and Gold Hill groups. The work that has appeared to be dead work is now giving place to active prospecting. In several, new crosscuts have been started to run for the west ledge. This work will be watched with the greatest possible interest, for in two or more of the mines they are liable to run into rich ore, and enough to make a deal so as to peddle out stocks, provided the public buy. In Andes, the work under way appears to be to develop the old Burning Moscow ground. It is high-grade ore. The work in the other North End mines and also Middle mines is of a favorable character, all of which has heretofore been outlined in this department of the PRESS.

From the outside districts, our advices are of a more encouraging character, and was it not for the activity in Comstock mining shares, the Tuscarora, Bodie and Qujiotoa stocks would be selling at much higher prices than are now ruling.

San Francisco Metal Market.

WHOLESALE.

THURSDAY, May 7, 1891.

ANTIMONY.....	— @ 18
BORAX—Refined, in carload lots.....	8 @
Powdered.....	8 @
Concentrated.....	7 1/2 @
All grades jobbing at an advance.	
COPPER.....	23 @
Bolt.....	23 @
Sheeting.....	23 @
Ingot, jobbing.....	18 @
do, wholesale.....	17 @
Fire Box Sheets.....	23 @ 25
LEAD—Pig.....	— @ 4 1/2
Sheet.....	7 1/2 @
Pipe.....	6 1/2 @
Shot, discount 10% on 500 bags Drop, 1/2 bag.....	1 50 @
Egg, 1/2 bag.....	2 00 @
Chilled, do.....	2 20 @
QUICKSILVER—By the flask.....	43 00 @ 45 00
Flask, old.....	40 @ 50
CHROME IRON.....	10 @ 20
Steele, English, lb.....	16 @ 20
Canton tool.....	9 @ 9
Black Diamond tool.....	9 @ 9
Pick and Hammer.....	8 @ 10
Machine.....	4 @ 5
Toe Oalk.....	4 @ 5
TIN PLATE—B. V., steel grade, 14x20, to arrive.....	6 25 @
B. V., steel grade, 14x20, spot.....	6 37 @
Charcoal, 14x20.....	6 50 @
do, roofing, 14x20.....	6 00 @
do, do, 20x23.....	13 00 @
Pig tin, spot, 1/2 lb, irregular, nominal.....	21 @
IRON—Bar, base.....	3 @ 3 1/2
Norway, base.....	4 1/2 @ 5 1/2
Spot.....	28 @
IRON—Glengarnock ton.....	30 00 @
Eglinton, ton.....	29 00 @
American Soft, No. 1, ton.....	— @ 32 00
Oregon Pig, ton.....	— @ 30 00
Fuel, Sound.....	— @ 30 00
Olay Lane White.....	25 00 @
Shotts, No. 1.....	30 00 @
Langdon.....	25 00 @
Thorncliffe, Ore.....	30 00 @
Gartsherr.....	30 00 @
Barrow.....	30 00 @
Cargoeet.....	27 00 @

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

It is stated that within a few weeks 15,000 men will be at work on the building of the Columbian Exposition, Chicago. It is expected that 30,000 men will be at work on the grounds in July.

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COMPANY AND LOCATION.	NO. AMT. LEVIED, DELINQ. AND SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes M Co., Nevada.....	37.....80c.....Apr 4, May 8, May 28.....	J W Twigg.....	308 Montgomery St
Oaledonia S M Co., Nevada.....	14.....15c.....May 2, June 4, July 5.....	A S Groth.....	414 California St
California Iron & Steel Co., California.....	5.....35c.....Apr 27, June 6, June 27.....	F Bonacina.....	438 California St
Carmelo Land & Coal Co., California.....	3.....50c.....Apr 11, May 16, June 16.....	W T Baggett.....	324 Pine St
Chollar M Co., Nevada.....	28.....50c.....Apr 6, May 13, June 2.....	C E Elliott.....	308 Montgomery St
Con Imperial M Co., Nevada.....	31.....5c.....May 6, June 11, July 1.....	O L McCoy.....	331 Pine St
Cons New York M Co., Nevada.....	5.....15c.....Apr 3, May 8, May 29.....	C E Elliott.....	308 Montgomery St
East Sierra Nevada M Co., Nevada.....	2.....5c.....Apr 14, May 29, June 15.....	G R Spivey.....	310 Pine St
Gray Eagle M Co., California.....	23.....5c.....Apr 3, May 18, June 9.....	A V Barrows.....	303 California St
Halo & Norcross M Co., Nevada.....	35.....50c.....Mar 17, Apr 22, May 4.....	A B Thompson.....	308 Montgomery St
Idelwild M Co., California.....	2.....10c.....May 1, June 1, June 20.....	E F Stone.....	306 Pine St
Indian Creek L & M Co., California.....	2.....6c.....Apr 7, May 11, June 1.....	S O Mills.....	419 California St
Inyo Marble Co., California.....	12.....10c.....Mar 30, May 12, May 23.....	W W Luce.....	132 California St
Kentucky Cons M Co., Nevada.....	1.....2c.....Mar 31, May 5, May 25.....	W W Pew.....	310 Pine St
Locomotive M Co., Nevada.....	10.....5c.....Mar 17, Apr 21, May 12.....	A H Fish.....	308 Montgomery St
Midas M Co., California.....	2.....10c.....Apr 27, June 5, June 23.....	A Halsey.....	328 Montgomery St
Mineral King M Co., Arizona.....	6.....10c.....Mar 23, Apr 23, May 18.....	T F Norman.....	419 California St
N Bloomfield Gravel M Co., California.....	47.....25c.....Mar 28, May 4, May 27.....	H Pichor.....	320 Sansome St
North Star M Co., California.....	8.....10c.....May 15, June 10.....	R J Ryan.....	230 Montgomery St
Peerless M Co., Arizona.....	3.....10c.....Apr 24, May 28, June 18.....	A Watern.....	308 Montgomery St
Silver Hill M Co., Nevada.....	28.....20c.....Apr 23, May 28, June 13.....	D O Bates.....	308 Montgomery St
Scorpion S M Co., Nevada.....	26.....15c.....Apr 14, May 22, June 13.....	G R Spivey.....	310 Pine St
Sylvania M Co., Nevada.....	1.....81.50.....Mar 14, Apr 28, May 23.....	J S Scoville.....	4 Sutter St
Union Pacific M Co., Nevada.....	1.....10c.....Mar 28, May 1, May 18.....	A J Chumant.....	328 Montgomery St
Umpire M Co., Oregon.....	3.....2c.....Mar 27, May 4, May 22.....	A Cheminant.....	328 Montgomery St
Valley View M Co., California.....	2.....20c.....Apr 13, May 18, June 8.....	W T Gunnett.....	308 Pine St
Yellow Jacket M Co., Nevada.....	43.....50c.....Apr 14, May 16, June 20.....	W H Blauvelt.....	Gold Hill

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Quailie Black Sand M Co., Oregon.....	O N Fox.....	530 California St.....	Annual.....	May 11
Commonwealth Cons M Co., Nevada.....	R R Grayson.....	331 Pine St.....	Annual.....	May 13
East Sierra Nevada M Co., Nevada.....	G R Spivey.....	310 Pine St.....	Annual.....	May 11
Scorpion M Co., Nevada.....	G R Spivey.....	310 Pine St.....	Annual.....	May 11
Silverado M Co., Nevada.....	A T Badlam.....	Chronicle Building.....	Annual.....	May 13

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M Co.....	T Wetzel.....	320 Sansome St.....	10.....	Mar 16
North Banner Cons M Co., California.....	T J Mitchell.....	401 California St.....	50.....	Apr 20
North Star M Co., California.....	D A Jennings.....	401 California St.....	50.....	Apr 20
Jackson M Co., Nevada.....	W R Drake.....	311 Pine St.....	10.....	Jan 19
Pacific Coast Borax Co., California.....	A H Clough.....	230 Montgomery St.....	1 00.....	May 11

Table of Lowest and Highest Sales in

S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING APR. 16.	WEEK ENDING APR. 23.	WEEK ENDING APR. 30.	WEEK ENDING MAY 7.
Alpha.....	85 1.30 1.25	1.45 1.25	1.35 1.20	1.50
Alta.....	1.00 1.00 1.10	1.45 1.10	1.20 1.10	1.20
Alta.....	1.50 1.35 1.40	1.70 1.35	1.50 1.45	1.40
Bulcher.....	2.50 3.00 2.70	3.05 2.45	2.75 3.00	3.25
Belle Isle.....	6.25 8.00 6.25	7.75 6.50	7.75 7.25	9.37
Best & Belcher.....	2.10 2.25 2.25	2.80 2.35	2.65 2.35	3.05
Bodie.....	1.20 1.30 1.20	1.45 1.15	1.20 1.10	1.30
Bulwer.....	.45.....	.40.....	.45.....	.35.....
Commonwealth.....	.80.....	.85.....	.90 1.05	1.15 .85 1.00
Cnn. Va. & Cal.....	12.00 14.50 12.50	14.75 12.50	14.75 14.12	20.50
Challenger.....	2.00 2.50 2.20	2.75 2.25	2.40 2.25	2.75
Confidence.....	2.75 3.25 3.05	3.70 3.05	3.40 3.05	3.75
Con. Imperial.....	.15.....	.20.....	.28.....	.20.....
Oaledonia.....	.75.....	.80.....	.75.....	.85.....
Oregon Folsom.....	2.50 2.80 2.50	2.90 2.25	2.60 2.20	2.90
Potosi.....	.15.....	.20.....	.25.....	.20.....
Del Monte.....	.20.....	.30.....	.35.....	.25.....
Eureka.....	3.85 4.00.....	3.90 4.00	4.00 3.75	4.05
Exchequer.....	.75.....	.85.....	1.05.....	.85 1.05
Grand Prize.....	.15.....	.20.....	.25.....	.20.....
Grand & Curry.....	3.10 3.50 3.20	3.70 3.10	3.45 3.30	4.00
Hale & Norcross.....	2.00 4.40 3.30	4.15 3.20	3.60 3.35	4.15
Julia.....	.20.....	.25.....	.25.....	.25.....
Justice.....	1.15 1.33 1.25	1.35 1.25	1.30 1.20	1.30
Kentucky.....	.40.....	.50.....	.50.....	.40.....
Lady Wash.....	.40.....	.40.....	.50.....	.40.....
Mono.....	.65.....	.70.....	.60.....	.65.....
Mexican.....	3.85 4.75 4.20	4.75 3.75	4.50 4.20	5.37
Nevada.....	.25.....	.30.....	.35.....	.20.....
Nev. Queen.....	.40.....	.40.....	.60.....	.45.....
Occidental.....	1.15 1.23 1.20	1.35 1.15	1.30 1.30	1.50
Ophir.....	5.75 8.12 6.87	8.12 6.25	7.75 7.12	9.62
Overman.....	3.60 4.05 3.60	3.30 3.30	3.70 3.60	3.95
Yellow Jacket.....	2.45 4.30 3.40	6.00 4.05	4.85 4.25	5.25
Peerless.....	.15.....	.20.....	.25.....	.15.....
Peer.....	.10.....	.20.....	.40.....	.15.....
Savage.....	2.65 3.50 3.10	3.40 3.00	3.35 3.35	4.00
S. F. & M.....	1.25 1.50 1.35	1.45 1.15	1.35 1.40	1.60
Sierra Nevada.....	3.3 3.73 3.15	7.0 3.05	3.60 3.35	4.25
Silver Hill.....	.20.....	.25.....	.30.....	.25.....
Scorpion.....	.30.....	.35.....	.35.....	.25.....
Union Con.....	8.50 4.25 3.75	4.15 3.50	4.15 3.95	5.00
Utah.....	1.10 1.20 1.10	1.30 1.00	1.20 1.10	1.55
Yellow Jacket.....	2.45 4.30 3.40	6.00 4.05	4.85 4.25	5.25

Sales at San Francisco Stock Exchange.

THURSDAY, May 7, 9:30 A. M.			
1280 Alpha Con.....	1.50	1400 Justice.....	1.35 @ 1.40
1580 Alta.....	1.25	1100 Kentucky.....	75 @ 85c
1170 Andes.....	3.00 @ 3.10	600 Lady Wash.....	45 @ 50c
800 Baltimore.....	35 @ 50c	240 Mexican.....	5 00 @ 12
110 Belcher.....	3.00 @ 3.50	100 Mono.....	60 @ 65c
100 Benton Con.....	2.00	700 N. Con. Wash.....	35 @ 40
320 Rest & Belcher.....	3.37 @ 3.50	320 Nevada Queen.....	45 @ 50c
300 Bodie.....	1.30 @ 1.35	600 North Belle Isle.....	80 @ 85c
170 Bullion.....	2.85 @ 2.90	300 North Savage.....	50 @
150 Bullion.....	3.00 @ 3.50	400 Occidental.....	1.45 @ 1.50
700 Challenge Con.....	2.95 @ 3.00	270 Ophir.....	3.87 @ 60
730 Chollar.....	3.80 @ 3.95	150 Overman.....	4.30 @ 4.40
60 Confidence.....	7.00 @ 7.37	350 Peer.....	20 @ 25c
350 Con. Wash.....	35 @ 40c		
60 Con Cal & V.....	19 @ 19 1/2	500 Potosi.....	5 00 @ 12 1/2
6020 Con Imperial.....	25c	615 Savage.....	3.80 @ 3.90
800 Con New York.....	45 @ 50c	300 Scorpion.....	45 @
100 Crocker.....	25c	1650 Segal & M.....	1.75 @
1000 Crows.....	35 @	1000 Silver Hill.....	1.00 @ 1.10
1000 Del Monte.....	35c	150 S. E. Hill.....	80 @
180 Exchequer.....	1.10	300 Union Con.....	4.80
570 Gould & Curry.....	4.00	1600 Utah.....	1.40 @ 1.45
850 Hale & Nor.....	3.35 @ 3.40	440 Weldon.....	1.00 @ 1.10
250 Iowa.....	40c	340 Yellow Jacket.....	3.15 @ 3.25
650 Jule.....	25c		

Assessment Notices.

GRAY EAGLE MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Placer County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 3d day of April, 1891, an assessment, No. 23, of Three (3) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 9th day of June, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
A. W. BARROWS, Secretary pro tem.
Office, Room 11, No. 303 California Street, San Francisco, California.

INYO MARBLE COMPANY.—LOCATION of principal place of business, San Francisco, California. Location of works, Keeler, Inyo County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 30th day of March, 1891, an assessment (No. 12) of Ten Cents per share was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, 132 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 12th day of May, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on FRIDAY, the 24th day of May, 1891, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

By order of the Board of Directors.
G. W. LUCE, Secretary.
Office, 132 California Street, San Francisco, California.

CARMELO LAND AND COAL COMPANY. Location of principal place of business, San Francisco, California. Location of works, Monterey County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 11th day of April, 1891, an assessment, No. 3, of Fifty Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 9, 324 Pine Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1891, will be delinquent, and advertised for sale at public auction, and unless payment is made before, will be sold on TUESDAY, the 16th day of June, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
W. T. BAGGETT, Secretary.
Office, Room 9, 324 Pine Street, San Francisco, California.

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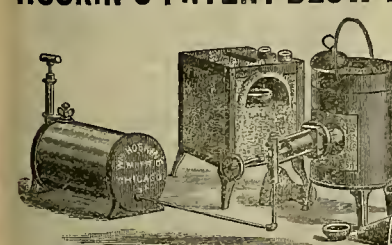
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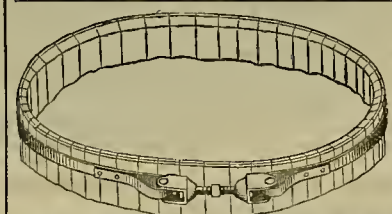
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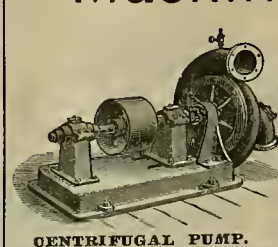
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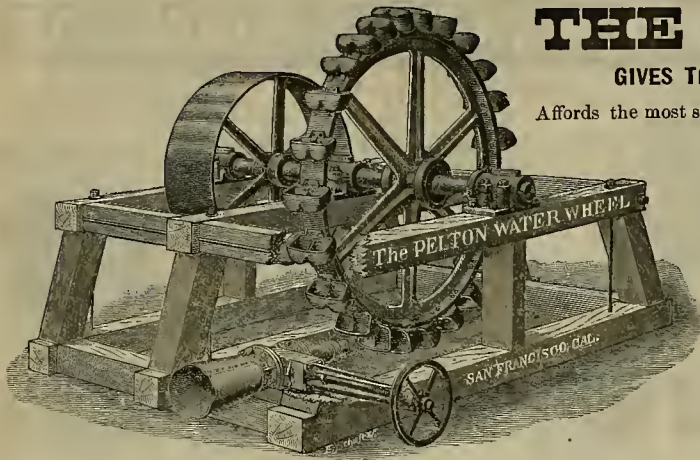


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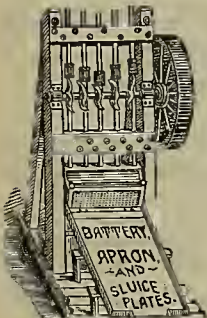
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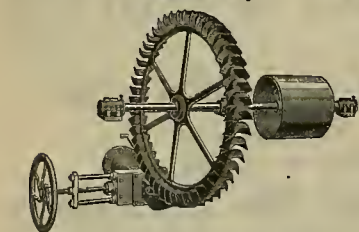
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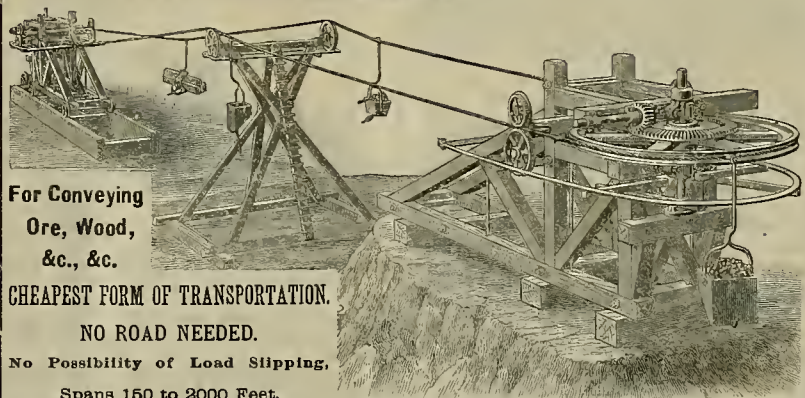
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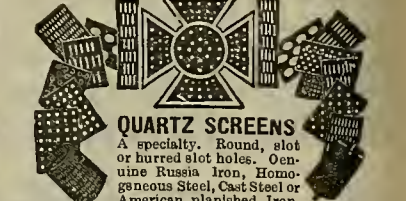
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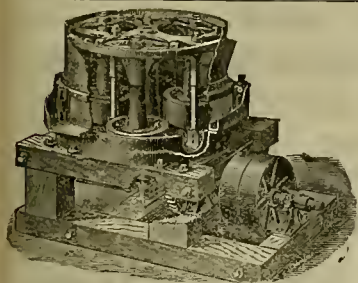
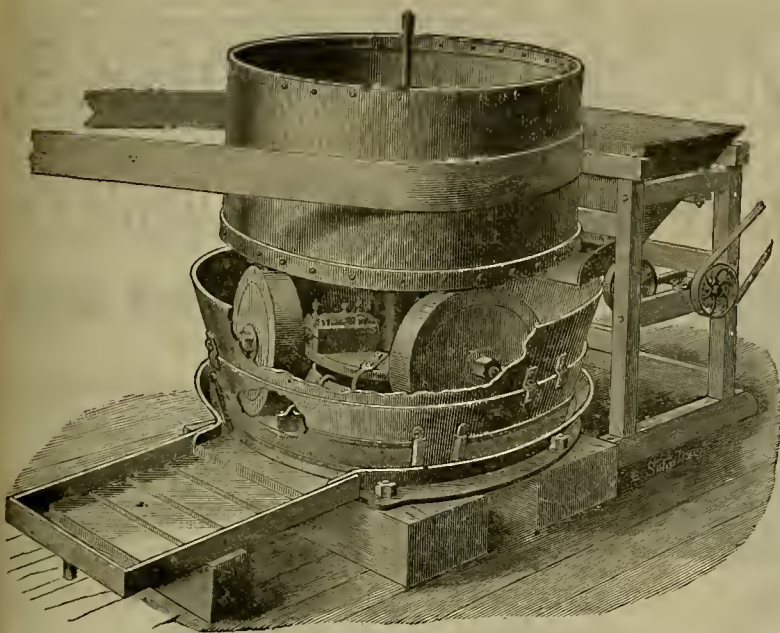
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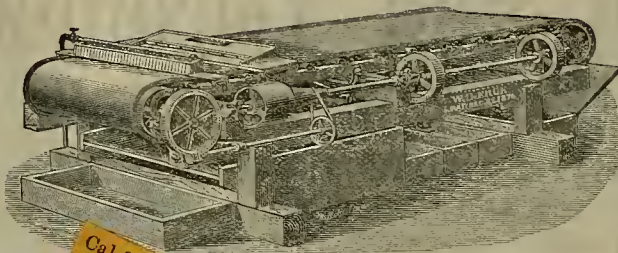
IMPROVED BELT FRUE ORE CONCENTRATOR.

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Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), London, October 8, 1885.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

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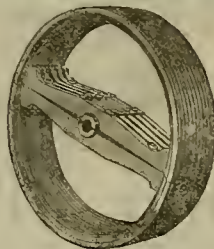
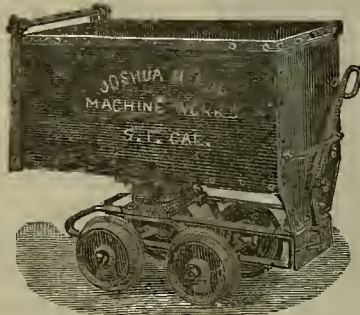
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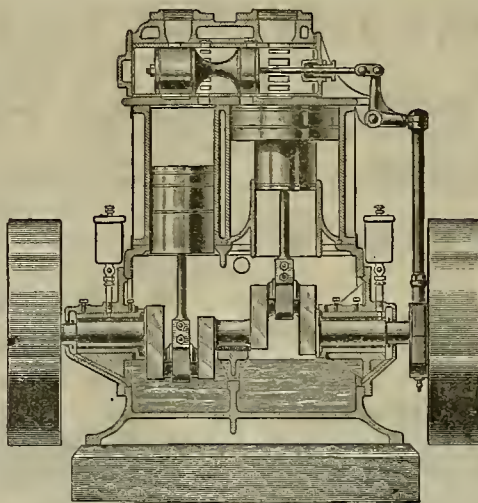
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One Machine Taking Pulp from 10 Stamps.



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An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXII.—Number 20.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, MAY 16, 1891.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

The Oldest Quartz Districts.

It is worthy of note that the oldest quartz district in California is to-day the most prosperous and best-paying one. This speaks volumes for the reliability and lasting qualities of gold mines. It was in 1850, one year after the discovery of placers on Wolf creek, that they began to work gold-bearing quartz in Grass Valley, Nevada county, and this was the first work of the kind, not only in California, but on the Pacific Coast of the United States. And yet to-day, Grass Valley district is the center of the gold-quartz industry of California. It has the best mills, the best machinery, the largest number of producing mines, the deepest mines, and the mine that has paid the largest number of consecutive dividends in the State. The progress and development has been steady and sure, and made in the face of many attractive excitements elsewhere, which have taken men away; but the district has kept its reputation for safe and fairly reliable returns.

The Grass Valley Union says that the reason for the good reputation of the district is to be found in the adoption of the most improved methods of amalgamating, concentrating the sulphurets, which were permitted to go to waste, the introduction of water power and especially by deep working, which has proven the reliability and strength of the ore veins. In early years the workings were superficial, and the machinery light, and although remarkably profitable results were in a number of instances obtained, a want of capital in many cases prevented the depth of exploitation that was necessary to make a mine. Later experience has shown that such properties would have had a profitable life if stronger machinery and sufficient capital could have been commanded, and now there are very few who doubt that the district has many unprospected and undeveloped veins that in coming years will be known as valuable mining properties. A long list of mines may be named, among which were and are the Massachusetts Hill, Gold Hill, Scadden Flat, Allison Ranch, Eureka, Idaho, Empire and North Star, that have yielded many millions of dollars, but it is considered not improbable that other mines now operating or at present idle will have an equally

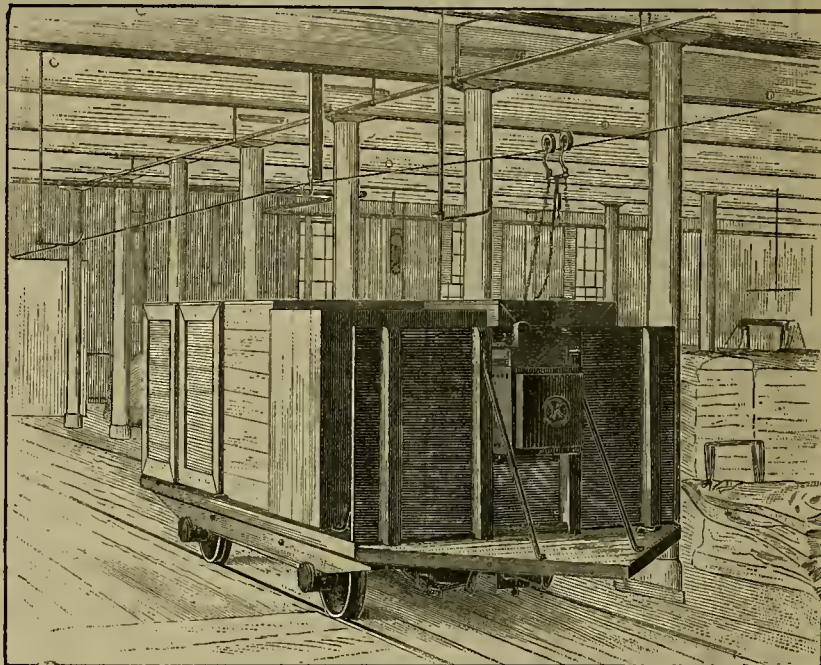
prosperous career. The district although the oldest on the coast is yet young in its possibilities as a gold producer, and from what has been accomplished and what the future promises, a century may not exhaust its riches.

A Bryan Mill Plant.

The Bryan roller mill is a modification of the well-known Chili mill, arranged for continuous wet crushing. The mill consists of an annular mortar containing fixed steel dies arranged in the path of the three crushing rollers, which, in the five-foot mill, are 45 inches in diameter, seven-inch face, and weigh 3050 pounds each. Their axles are fixed in them and journaled on a central revolving table attached to and driven by the belt pulley, making a very direct application of power.

The four-foot mill has a similar arrangement of dies, but smaller rollers, weighing 1200 pounds each, exclusive of the drum, which rests on their periphery, adding to their weight and driving them by friction. The crushing weight of the rollers can be increased as desired by loading the tank driving pulley.

These mills, which are made by the Bladen Iron Works of this city, have an unusually large area of screen surface, permitting the free discharge of pulp and preventing sliming. Many prefer these mills to stamps, for the reason that they are portable and quickly and cheaply erected, require less power and a less first cost. The accompanying engraving shows a complete



ELECTRIC TRAM CAR FOR MILLS.

Bryan mill plant arranged for free-milling gold ores.

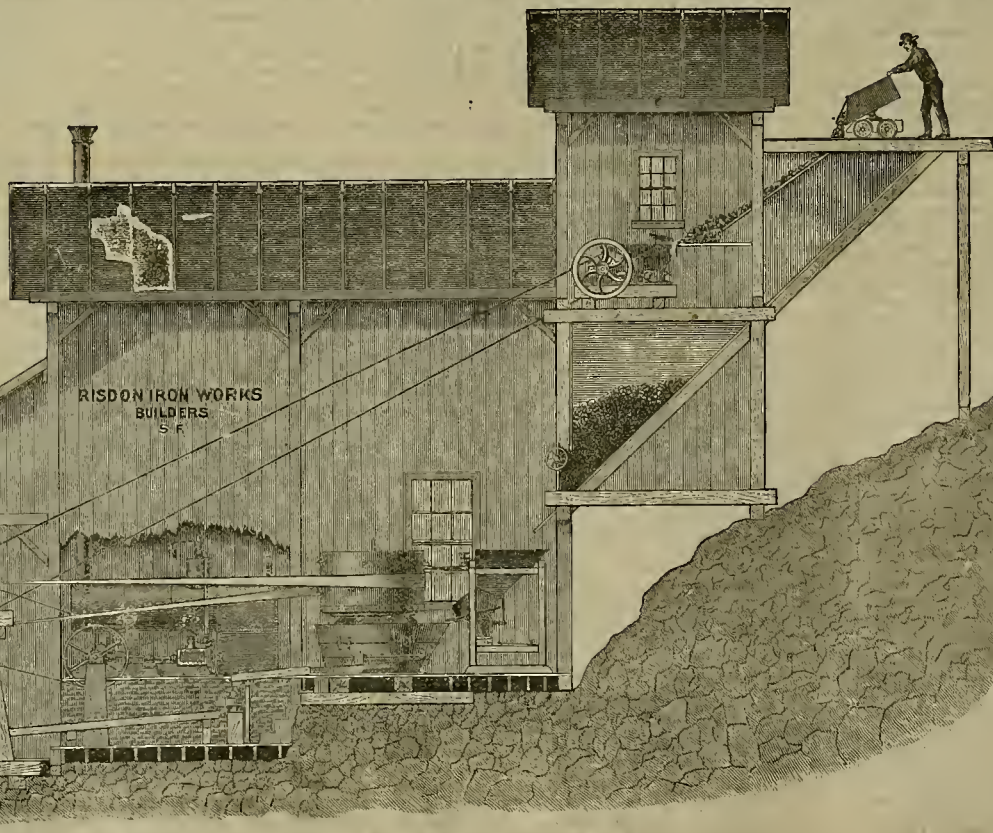
An Electric Mill Tramway.

One of the earliest applications of the Thomson-Houston motor to tramways is shown in

the accompanying illustration. The tramway which runs from one building across a bridge, and the entire length of another building, is about 800 feet in length, and has a grade of about three per cent. The single overhead-wire system is used, the rails serving for the return current. The duty of the motor is to transport about four tons. The success of this installation is unquestioned, and it has been clearly shown how much time and labor can be saved by the use of such tramways in mill work. Anyone can readily see the advantage of a narrow tramway running the entire length of each floor, by means of which materials can be moved as desired.

Nearly every large mill is now equipped with a lighting plant, rendering it perfectly feasible to devote a portion of the current for operating tramways in various parts of the building, thereby facilitating the handling of materials and supplies at less expense and labor than could be accomplished by any other method. Around quartz-reducing plants, an electric tramway of this kind would be of the greatest convenience.

THE California World's Fair Commissioners will not consider applications for positions, nor fill any offices until the July meeting in this city.



BRYAN MILL PLANT FOR WORKING GOLD ORES.

Observations in Colorado and Utah.

Mineral Display at World's Fair.

[Written for the PRESS by ALMARIN B. PAUL.]

While letters from the various sections of California may be more interesting to your readers, yet possibly a line from Colorado will not be devoid of interest. I have now been here two weeks and have picked up some ideas among mining men and the various works. There is one fact that forcibly impresses itself upon my mind, and that is, Colorado has by all odds more advantages for mining capital than California. The hotels here are continuously filled with Eastern and Western capitalists, and Colorado's prosperity in the past few years has been quite a loadstone for drawing in much money for mining and other investments. It has forced itself on my mind very strongly that Californians need not have the "big head" as regards the point of their being the only properties capital should invest in, or that they can make capital more safe. The fact is, there is a great deal of life and enterprise in Denver, which causes no especial desire to reach out for better things elsewhere, especially as regards real estate and merchandizing. Here are two very large smelters. When I say that at the Hill works I counted 30 chimneys, you can form some idea of the expansiveness of the establishment. The Grant is also a very large concern.

The mining interest of Colorado is advancing steadily. Her gold and silver output for 1890 was many millions in excess of California, and the prospects are that 1891 will over-reach 1890. While here I have not only inspected the large smelters, by courtesy of proprietors, who gave me unusual advantages, but gave some attention to the McArthur-Forrest process for treating ores by cyanide. This process was first brought out in Scotland, large works being operated there; also in New Zealand and South Africa. The company in Denver, of whom Senator Tabor is president, Leonard Gow vice-president and L. L. Wiswall secretary, hold the right for the United States. This company has erected a ten-stamp mill with all the necessary appliances for treating from 15 to 20 tons per day, and as far as I have investigated the process, it is not too much to say that there is enough reality in it to present itself very favorably to my mind.

From what I have been shown as to the per cent obtainable in a very simple way, it is a system that Californians may regard as worthy of their consideration and as having passed the experimental stage. I will not undertake to give any explanation of it, as any of your readers can get pamphlets which will fully enlighten them by writing to secretary of company, Tabor Opera-house block, Denver, Colorado.

There is a Board of Brokers here who have about as much jaw and can hallow as loud and quick as the pine street bulls and bears. Stock listed on the Board is classified as dividend and non-dividend stock, and there is a constant and satisfactory business done by the Board.

The mines listed embrace no Comstock line, but all localities are operated in, so there is no see-saw in their movements "on the line."

As to mining machinery, I have seen but very little new—in that California is unquestionably ahead. Notwithstanding I make the observations I do, it is just to say that California to very many is a desirable State to visit and live in; fruits, flowers, and climate are the main attractions.

Now as to Salt Lake, Utah, it has not so much to show as Denver. At this time there is quite a stir about the Deep Creek mines, in Southern Utah, and many are going hither. The ore thus far brought in gives good backing for the tales told of that locality. This mining stir is stimulating prospecting in other sections, and the prospects are that Utah will go ahead rapidly from now on, from the simple fact that from now on there is going to be more bullion produced. The farmer, merchant, commercial man or real estate operator seldom gives a thought to the mining interest. He "wants nothing to do with mining," but where would they be if there should be a stoppage of the production of the precious metals? There is a general interest, in both Colorado and Utah, in their mineral exhibit for the World's Fair, and now while I think of it, what is California proposing to do? Of the \$300,000 appropriated by the State, how much is going to be set aside for the mineral exhibit? It is not to be supposed that the meager appropriation to the Mining Bureau is to make the exhibit as well as run that institution. The miners of California want to demand their share of the State's appropriation, or let the making of an exhibit have the go-by.

The mining interest has been imposed upon by the Granger and railroad landed interest long enough and unless they see to it, all of the "grand display" will be more largely in the interest of land manipulators. The Mining Bureau, is the proper institution, in connection with a few representative mining men from every mining county of the State to have charge of collecting, and making the mineral exhibit of the State. Not less than \$50,000 of the State's appropriation should be devoted to the mineral exhibit, and what there is lacking over that the mining counties would appropriate. It is advisable to have this question of how much is to be set aside for the Mining Department settled as soon as possible, for then miners can see if there is to be any encouragement

for them to go ahead for a grand display. The mining element is in no very especial good mood for hooming the general landed interest, and unless there is a spirit of liberality shown, there will be no effort made to display the vast wealth stored in our mountains. These sentiments are simply the echo of what I pick up on the wayside. Colorado is going to lead off in the mineral display, and to equal her California has got to do her best. The fact is, if California really tries, she can have the most attractive display if not the largest, and this will be so from the fact that more gold would glitter in her display along with her variety of base metals, building stones, etc., etc. As I view it (from past experience) there is no time to fool away in getting to work for the fair, so let the powers that be, say how much of the \$300,000 appropriation is to be set one side for the mineral display. Taking the new discoveries, the output of silver in Colorado and Utah, which latter will exceed her last year's product in silver largely, there is going to be too much silver for the gold product of the country unless some big gold find comes to the rescue.

There is no doubt in my mind but gold properties will soon be more in demand than for many years in the past. There is no discount on gold and there is no such thing as balancing the two metals when the product of silver is much in excess of gold. More gold mines must be worked to do it.

Academy of Sciences.

At the recent meeting of the California of the Academy of Sciences the whole staff of teachers of the Leland Stanford, Jr., University were proposed for membership, as follows: Prof. D. S. Jordan, President of the University; Prof. C. H. Gilbert, Prof. W. H. Campbell, Prof. O. P. Jenkins, Dr. J. G. Brame, Prof. Joseph Swayne, Prof. H. B. Gale, Prof. C. F. Marks, Prof. G. M. Richardson and Prof. F. S. Fritz.

Prof. Carl Lumholz, who achieved fame by his account of life among the Australasian abnatives, read an interesting account of his explorations in the Sierra Madres of the State of Chihuahua. He thought it the richest country on the North American continent for archaeological research. He related something of his discoveries in the botanical line, and stated that he had found imbedded in clay a huge horn of some gigantic species of bison now extinct—so large that it had to be sawed into three sections to be removed.

G. P. Rexford read a paper on "Some Indian Hieroglyphics at Swansea, Inyo County, Cal." His account of these curious examples of picture carving on the rocks was illustrated with some capital photographs.

E. J. Molera read a paper on Gen. Y. Banez, who had been President of the International Board of Weights and Measures.

Electric Transmission of Power.

The Clear d'Alene Company of Idaho have under construction a power plant which, considering its extent and the variety of work to be operated, will be one of the most important installations of a mining character yet made.

The plant is located on Canyon Creek about 1½ miles from the mill and mine of the company and consists of two 225 horse-power Edison generators driven by Pelton wheels running under 690 ft. head. The mill machinery will be run by an 80 horse-power motor helted direct to the main shaft. The compressor will be run by a 60 horse power motor helted to fly wheel; the hoist will also be run by a 60 horse-power motor geared direct to present driving shaft. The pump located on the 500 ft. level will be run by an 80 horse-power motor geared direct.

The entire plant has been planned to connect with the machinery already in use now operated by steam. It is expected that the operating expenses of the company will be reduced full 50 per cent when the new power station is in running order.

SANDING SAMPLES.—Two of the most prominent ore-samplers in Colorado have just been detected in one of the most extensive steals ever made from a mining company in the Aspen section of the country. They were handling 100 tons of ore daily of the Compromise Mining Company and about as much more in the aggregate from other small companies. Their method of robbing the producers was by putting sand in the sample that was divided, half to be returned to the mine-owners and half to be assayed at the sampler, by which means they largely reduced the percentage of lead and silver in the sample and ran it high in silica, making the cost of treatment much greater. By putting the same amount of sand in both samples, the assay of the mining company's chemist always tallied with that of the assayers at the sampler. Then they would make out a statement to the smelters, after settling with the Compromise Mining Company, to correspond with the real value of the ore. In this way in a few months they swindled this mining company out of \$30,000, and when caught in the act of putting the sand in the sample confessed to all their peculations.

PROF. BARNARD of the Lick Observatory has rediscovered Woll's periodic comet. This is the first return of the comet to its perihelion, and its reappearance has been looked forward to with great interest.

Dealing in Silver Bullion.

The bulk of the silver product of the United States comes from a number of large smelting works, some of which are the property of and are operated in connection with the mines from which the ore they treat is raised. The largest concern of this kind in the United States is, however, independent, purchasing ore at various mines, the general process being to buy ore on an assay value of the precious metals it contains. After treatment in the smelter, the silver bullion comes out in a form known as commercial bars. These are generally large oblong slabs of metal, weighing on the average 1000 ounces. Of course other supplies to a limited extent furnish part of the bullion dealt in the New York market, such as the melting down of old silver or of foreign coin. But the bulk of the supply, as already stated, is the product of the smelting and reduction works of the country. A silver market per se does not exist. The silver product of the country, or at least 90 odd per cent of it, passes through the hands of a few firms and banks in New York and San Francisco, which possess the experience and the facilities for handling it, and which make a specialty of the business. There are probably not a dozen establishments engaged in it to any extent, and three or four houses it may be confidently stated, monopolize the greater portion of the trade. Silver is consigned by smelting and mining companies to the bullion dealers or to the few banks which attend to this kind of business, who dispose of it in the market, sell it to the Government, ship it abroad or buy it themselves, and act as agents or the consignees for the principals.

Commercial bars averaging about 1000 ounces each are usually .999 fine; that is to say, transactions in them are made upon that basis, and bullion shipped from the well known smelters is accepted as of that fineness, which corresponds to the United States coinage standard. A certain number of bars are sent to the Assay Office and converted into United States assay bars, rather thin bricks of silver weighing about 200 ounces each, bearing the United States Assay Office stamp of weight and fineness. These are in demand for commercial purposes; silversmiths and others prefer them on account of the guarantee of fineness. Silver bullion shipped to Europe, however, is usually taken in the form of commercial bars. They are simply carted to steamships and placed in the treasure-room for transport, it being very unusual to pack silver bullion with the same care that is bestowed upon its more precious fellow, gold. Commercial bars also form the bulk of the stock held at New York against which silver bullion certificates are issued. The bullion held against these certificates is considered as 1000 fine, although it is the practice to transmute the figures, 1000 ounces of silver .999 fine being represented by 999 ounces 1000 fine. The price of silver in the market represents the figures at which it can actually be sold, either for export or commercial purposes, it being the selling quotation of leading bullion dealers. Until recently, of course, the price was fixed in New York by parity, at current rates of exchange, with the price in London. The London quotation itself is made in the same way, the bullion market there being, in fact, the transactions and figures of a few houses and banks which make a specialty of such business, dependent of course, on rates of India exchange, the relative advantage of shipping silver to the East in place of remitting exchange, and the demand for coinage purposes from India, China, or European countries. It is to be observed that the English standard of fineness for silver is .925 fine, so that American prices represent an allowance for this difference of .075 in fineness, as well as for the rate of exchange, which may vary from day to day.—*Bradstreet.*

STEPS TO CIRCULATE SILVER.—The first of the steps contemplated by Secretary Foster for getting the subsidiary coin now in the Treasury into circulation were taken May 1, when the following notice, signed by United States Treasurer Neheker, was prepared at the Treasury Department, and will be sent to the banks and bankers throughout the United States: "The coinage of standard silver dollars authorized by the Act of February 25, 1878, has been discontinued by the Act of July 14, 1890. The Treasurer finds it inconvenient to furnish them otherwise than in the redemption of silver certificates or treasury notes, but will forward silver half-dollars, quarter-dollars or dimes to any address free of cost for transportation, by express, in sums of \$200 or more, or by mail, in packages of \$70, in exchange for any other kind of money deposited in the Treasury or any sub-Treasury or depository bank. Remittances for this purpose will be received by the Treasurer and Assistant Treasurers in the form of drafts on any bank or banker in Washington, New York, Boston, Philadelphia, Baltimore, Cincinnati, Chicago, St. Louis, New Orleans or San Francisco."

GEORGE H. PHILLIPS will probably be Capt. Hillman's successor as Inspector of Bolders here. His appointment has been recommended to the Secretary of the Treasury by the Board of Examiners. Mr. Phillips is at present superintendent of the Pacific Coast Steamship Co., and is a thoroughly experienced man,

Cutting Timber on Public Lands.

It May Be Done for Certain Purposes.

Commissioner Carter of the General Land Office, with the approval of Secretary Noble, has issued to registrars and receivers an important circular letter of instructions which shall govern in carrying into effect the sections of the General Land Act of March 3, 1891, relating to the cutting of timber from public lands. These sections only apply to the States of Colorado, Montana, Idaho, North Dakota, Wyoming and Nevada, the Territory of Utah and the District of Alaska.

The important features of the circular are as follows: "Settlers upon public lands, miners, farmers and other bona fide residents in either of the States, District or Territory named in this Act, who have not a sufficient supply of timber on their own claims or lands for firewood, fencing or building purposes, or for necessary use in developing the mineral or other natural resources of the lands owned or occupied by them, are permitted to procure timber from the public lands strictly for the purposes enumerated in this section, but not for the sale or disposal or use on other lands or by other persons; but this section shall not be construed to give the right to cut timber on any appropriated or reserved public lands, and the Secretary of the Interior reserves the right to prescribe and revoke such privileges.

"Persons, firms or corporations who desire to cut timber from the public lands for the purposes of merchandise, or for any other use whatsoever other than as defined in sections 2, 3 and 4 of these regulations, must first submit an application therefor to the Secretary of the Interior, designating the lands by sections, township and range, if surveyed, and if not surveyed describing the land by natural boundaries, and the estimated number of acres therein. They must also define the character of the land and the kinds of trees or timber growing thereon, giving an estimate as to the quantity of each kind, stating which particular kind or kinds they desire authority to cut or remove, and the specified purpose or purposes for which the timber or product thereof are required. The application must be sworn to and witnessed by not less than four reliable and responsible citizens of the State, District or Territory in which the land is situated, and who reside in the locality of the particular land described. The petitioner or petitioners should also submit with the application such evidence as can be procured to conclusively show that the preservation of trees or timber on the land described is not required for the public good, but that its use as lumber or other produce, and for the purposes named in the application, is a public necessity, and if deemed for the public interest the desired permission will be granted.

"In order that farmers who desire to have forests preserved in the interest of a water supply for irrigation, and all others having adverse interests, may have due notice of such application, the parties making application shall cause to be published, at least once a week for three consecutive weeks, in a newspaper of general circulation in the State, District or Territory, and also in a newspaper in the county, or, where there is more than one county, in each of the counties wherein the lands are situated, and a printed copy of the published notices must be submitted with the application, together with the affidavits of the publisher or foreman of each newspaper attached thereto, showing the same was successfully inserted the requisite number of times and the dates thereof.

"The cutting or removing of any timber from the public lands described in the application by or for the applicant, before his authority has been officially granted by the Secretary of the Interior, will render the party so offending liable to prosecution for trespass and subject his application to rejection.

"Sawmill owners, lumber-dealers and others, who in any manner cause or procure timber to be cut or removed from any public lands in violation of law, or these rules and regulations, whether directly or by men in their employ, or indirectly through contract or by purchase, are equally guilty of trespass with individuals who actually cut or remove such timber and are alike liable to criminal prosecution."

Breyfogle.

The *Chloride Belt* says: It is said that the men already at the Breyfogle mines take out enough gold from their placer claims to enable them to pay wages to new arrivals to work in their quartz claims.

By wagon road the Breyfogle mine is 200 miles from Candelaria. The road is a good one, water being within a day's journey in all cases excepting between Amagosa and Ash Meadows, a distance of 55 miles, where it is necessary to pack it.

Southward the star of Empire takes its way. Breyfogle continues to draw restless spirits from Candelaria and other adjacent towns.

Sheriff Boh Stewart came in from State Line to-day. He informs us that L. J. Hanohett returned from Breyfogle the early part of the week and is enthusiastic over the new discoveries. He will at once remove the Stewart mill, three miles from Lida, to the scene of the new discoveries. Mr. Hanohett will return to Breyfogle the coming week.

Now for the other side. Hank Melone and S. B. Fuller of Tule Canyon also returned from

Breyfogle. They report the new discoveries to have been grossly exaggerated, and declare that at present there is nothing there to induce the rush. However, as there is mineral all over the country, they concede that some of the numerous prospectors are liable to make important discoveries at any time.

Gas Treatment for Insects.

California can claim credit for the suggestion and practical development of many insecticides and insecticidal apparatus. Perhaps the most striking is the treatment of large trees with gases for the destruction of scale insects. This treatment is now being largely used for scales infesting citrus fruit trees in the southern part of the State. We have from time to time published information on this point and illustrated some of the devices employed for bringing the poisonous vapors directly to bear upon the scales. We give herewith a very complete arrangement for enclosing trees in tents in which the gas is generated—two tents being employed to save time, because while one tent is being filled with the gas the other one is adjusted upon another tree. The engravings are

Minerals in the Big Horn Mountains.

The opening of the Crow reservation, says the *Montana Mining Journal*, restores to the public domain all the mountainous land in the Big Horn mountains, west of the Big Horn river, and this will be open to the prospectors soon as the west boundary of the Crow reserve is surveyed and marked, as provided in the law. So far none of the precious metals have been found in the mountains, though there are tales and rumors of some rich gold leads on the north side of them. Gold has been found in placers and lodes on the head of Tongue river last year, and no doubt a number of people will visit that locality this spring as soon as the snow will permit them to prospect for the precious metals. These mountains have never been prospected in a thorough manner. In 1864, Bridger led a train, which was accompanied by a number of men who came to seek their fortunes in Montana, to Virginia City, and stopped in the Big Horn Basin, on the west side of the Big Horn mountains, several weeks to recruit, and while there, Mitch Bonyer, a famous scout, afterward killed with Custer, led a party of prospectors across the

A Virgin Field for Prospectors.

There have been no rich placer fields discovered since 1865. In the 15 years that intervened between the first excitement in California and the last excitement in Montana, Idaho and British Columbia, thousands of prospectors who had learned their sailing in the gold-fields of California used pick, shovel and pan on every creek and bar on the Pacific Coast, and the fact that no diggings of consequence have been discovered in late years is pretty good proof that their search was a close one, and that they did not run over the ground. Tradition is that old Mexico was thoroughly prospected for gold and silver quartz ages ago, the result of the prospecting being the discovery of mines that were worked for centuries. The prospecting must have been thorough, for, although visited by many of the most noted prospectors of America, no finds of importance have been announced of late years. What is true of Old Mexico is, in a great measure, becoming true of the United States. Although the mining industry in the Republic to the south shows no signs of exhaustion, it will be admitted by all observing men that the field for

did it the other night. He is an employee of the Ryan smelter, working on the night shift, and it is only through great presence of mind that he was not burned to death. By some mistake he lost his balance and started to fall headlong into an immense pot of molten metal. As he fell he caught the rim of the pot, and although he was immersed almost to his armpits, he drew himself out, and with almost superhuman effort threw himself into an adjoining pot filled with cold water. Some of his fellow-workmen saw him cast himself into the second pot, and rushing to his assistance, rescued him. His hands were badly burned, but otherwise he had hardly a scar on him. The secret of his escape was that he had on heavy woolen underwear and outer clothing, and before it had been burned through, Adams was in the pot of cold water.

Gum in Ramie Fiber.

The recent discussions of ramie-growing and fiber extraction have had allusions to the gum in the fiber as it is removed from the stem of the plant and the necessity of its removal. There has been inquiry as to the proportions of raw fiber to stem, of ungummed fiber to raw fiber, etc., in California grown and treated samples of ramie. Some assays of ramie have recently been made at the Experiment Station laboratory in Berkeley, concerning which we have secured from Prof. Hildard the following preliminary facts, which will no doubt be presented in more formal shape in some future Station publication.

The samples of ramie used in the investigation were (1) raw fiber decorticated by machine during the last Mechanics' Fair in this city; (2) a sample worked by hand for comparison at the University. The following are outline results of the assays:

Machine-made fiber from S. F. contained:	
Moisture (dried at 100° C.)	12.00 %
Gum	34.00 "
Ramie air dried and worked in Berkeley by hand:	
Moisture (dried at 100° C.)	11.17 %
Whole bark	21.20 "
Fiber (raw with gum)	15.90 "
Fiber (pure without gum)	11.00 "
Whole bark (air dried) contained:	
Cuticle	25.00 "
Decorticated fiber	75.00 "
Gum (contained in above)	41.50 "
Fiber decorticated by hand:	
Contained gum	30.80 "

The above data show that the estimate heretofore made of 15 per cent of raw fiber from the dry stalk is a conservative one; and the fact that the percentage of moisture in the stalks and in the raw fiber is practically the same, shows that the same rate will hold out in the drier air of the interior of the State, although, of course, both stalk and fiber will weigh several per cent less in absolute measure.

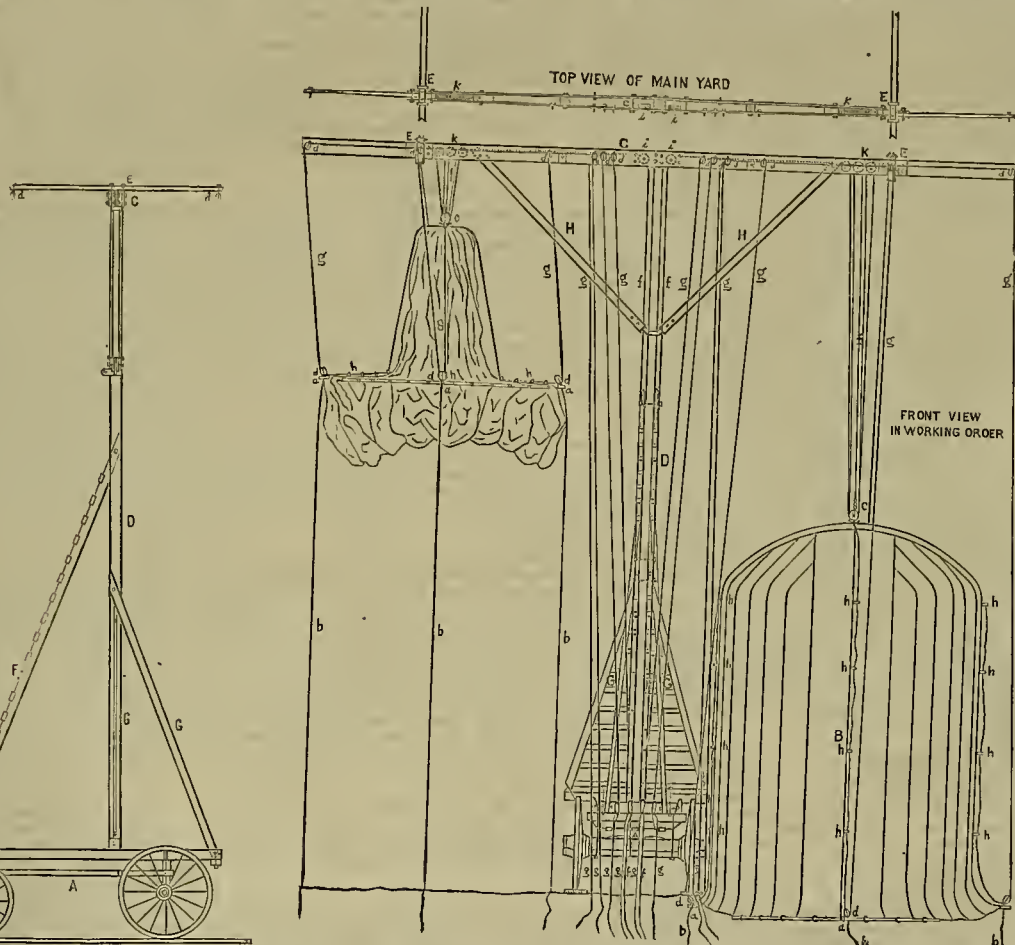
It is also seen that about 79 per cent of the entire stalk is recovered in the form of trash, available for return to the soil; to which will be added five or six per cent of offal, consisting of the outer skin (cuticle) of the bark and of gum mechanically detached in the process of decortication. The value of this offal as a return to the soil is now being investigated.

The two last columns give a good idea of the large proportion of gum contained in the outer coat of the stalk, being nearly 42 per cent in the "whole bark," and from 30 to 35 per cent in the "decorticated" fiber. The smaller percentage found in the sample treated at the University is doubtless due to the raw fiber having been worked (by hand) in the driest condition possible, while the machine worked in the damp air of San Francisco, renders the gum less brittle and therefore detaches less of it than will be the case in the dry air of the San Joaquin valley.

ASSAY OFFICE AND CHEMICAL LABORATORY.—After nearly 15 years' steady service in the position of chief of the ore-assay and analytical department in the house of Thomas Price & Co., Mr. J. T. Evans has severed his connection therewith and has opened an assay office and laboratory at rooms 46 and 47 Montgomery Block. Here Mr. Evans proposes to devote himself to the following lines of work: Assay of ores for gold and silver, lead, copper, iron, tin, zinc, mercury, antimony, etc. Analyses of ores, minerals, metals and their alloys, waters, soils, clays, lime, mortars and cements, fertilizers, coal, natural gas, tanning materials, alcoholic liquors, baking powders, carbonate of soda, borates, waste products, paints, oils, dyes, coloring matter, etc. He will make also analyses appertaining to medical chemistry, and examinations of drugs, chemicals and food, to ascertain their purity. Mr. Evans is a skillful and experienced man, and deserves a fair portion of the patronage of the interested public.

VERY RICH ROCK.—Sam Boston and his partner not long since pounded out in a hand-mortal a large candle box full of ore from their mine in Silver City, from which they extracted over \$1200 worth of gold. The residue was then thrown in an amalgamating pan to enrich lower grade ore.

A DEPOSIT OF \$150,000 has been made in Victoria, B. C., as the first payment of a total sum of \$1,500,000 offered for the purchase of the Silver King mine on Toad mountain, West Kootenai.



SIDE AND FRONT VIEWS OF APPARATUS USED IN THE GAS TREATMENT FOR KILLING SCALE INSECTS.

from the 1890 report of the State Board of Horticulture and represent the apparatus built by S. W. Preble of Tustin City, Orange Co., Cal., and is used in his orange grove. The measurements were taken on the spot by J. A. Shilling, and, in connection with the drawings, should convey a full idea of the construction of the device. The scale is $\frac{1}{2}$ inch to 1 foot. The apparatus, attended by two men, worked most perfectly in all its parts.

In the figures the lettering is thus explained: A. Wagon. B. Tents (2). C. Main yard. D. Mast. E. Crossbars (2). F. Ladder. G. Mast stays (6). H. Main yard truss (2). a. Trull boards (8), to bottom edge of tents. b. Guide lines (S), one-half inch diameter to trull boards, 30 feet each. c. Six-inch blocks (2), double sheave, for hoisting tents. d. Four-inch blocks (20), single sheave, for hoisting trull boards. e. Belaying pins (4), galvanized iron, to fasten ropes. f. Main ropes (2), three-quarters inch diameter, for hoisting tents, 190 feet each. g. Trull ropes (8), for hoisting slides of tents, one-half inch diameter, 120 feet each. h. Rope thimbles (32), one-half inch diameter, galvanized iron, for trull ropes of tents. i. Six-inch sheaves (2), brass, in main yard, for hoisting tents. k. Five-inch sheaves (6), brass, in main yard, for hoisting tents.

The process of generating the hydrocyanic gas to fill the tents to destroy the scale and the duration of exposure necessary to kill the insects, etc., has already been published in our columns.

WATCH FACTORY.—Articles of Incorporation of the San Jose Watch Company have been filed at San Jose with a capital of \$350,000. The company has bought the Olay Watch factory plant and will locate it at Alviso, Santa Clara county.

mountains, who panned the streams in the mountains as well as those which issue from them and run into the Little Big Horn and Big Horn rivers. While they found gold everywhere, in no place was the dirt rich enough to induce the party to encounter the danger from the Indians, which at that time was very great, by remaining to work the richer ground.

The greater portion of these mountains being on the Crow reservation, has kept them from being prospected in recent years. The people, or, rather, a few of them, along Tongue river have done some prospecting, and some lodes have been found, but they have never been systematically worked, and their value is not known. The difficulty of prospecting these mountains is great. They are abrupt, and the walls of nearly all the streams form box canyons, the larger of which are hundreds, and in some instances, thousands of feet deep, and which can only be entered at a few places. One of the greatest of these is the Black canyon, which is some 25 miles long and empties into the Big Horn river, some 10 miles south of the mouth of the Big Horn canyon. To this there are but two or three entrances, and these very rough and difficult. This canyon follows the line between Montana and Wyoming, and some time will be sought by tourists as one of the celebrated places in the mountains. Now that gold has been found in paying quantities in these mountains, and some 60 miles of them opened to the prospector, we shall be surprised if some good camps are not located in them in the next five years.

The supervisors have refused to grant the California Electric Improvement Co. a franchise for the erection of poles, wires, etc., in this city, the object being to prevent any more poles from being put up.

the surface prospector is becoming less in extent each year.

Nevada, the alma mater of the quartz prospector, has been as thoroughly prospected for quartz as California, the alma mater of the placer prospector, has been for placer ground, and a rich quartz find in the one would be as surprising as a rich placer find in the other. Colorado is fast becoming like Nevada. Montana, Wyoming, Utah, New Mexico and Arizona are no longer virgin fields. While Idaho and Washington have still small areas unprospected, the veteran prospector does not take kindly to the general mineral character of the latter, and hopes for little from the former.

There is but one region on the Pacific Coast left untrod by these pioneers of an industry that has done so much to uphold an empire in the West. That region extends from the international boundary line north to the 60th degree of latitude—a distance of fully 700 miles—with a breadth of from 200 to 300 miles. That this region remains virgin is because of the foolish saying, oft repeated, that there is no mineral north of the international boundary line, taken in connection with the idea that the laws of British Columbia are illiberal and unfair. The discovery of vast mineral wealth in the Kootenay Lake country disproves the foolish saying, and the laws of British Columbia need only to be examined to prove that they are not only illiberal to the prospector but fair and just to all law-abiding people. In no country on earth is life and property more safe than in British Columbia; and no people are more tolerant on political questions.—*British Columbia Miner.*

IMMERSED IN MOLTEN METAL.—But few men, says the *Tacoma Globe* have ever fallen into a riot of molten metal and escaped with a few trifling burns, yet John Adams of Tacoma

MINING SUMMARY.

The following is mostly condensed from journals published in this interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—Cor. Amador Ledger May 9: Since my last, operations at the North Star have come to a sudden standstill. How long the suspension will be is hard to say. The developments have been discouraging for some time, but the stockholders have kept up the assessments in the face of all discouragements, and deserve great credit for their pluck and enterprise, for they are mostly poor men. The general opinion among those interested is that they should drift in some other direction, and perhaps sink, as there is absolutely nothing in sight to justify going any farther. As the bond of the property expires in June, it was not considered advisable to undertake further development without first securing an extension of the bond. After a number of propositions were discussed, one seemed to strike the directors favorably, namely, that the owners were willing to grant an extension of the bond for five years, on condition that in the event of striking ore one-third of the gross proceeds shall be applied to the purchase price until the entire price, \$27,000 is paid. Papers were drawn up to this effect, but after a more mature consideration of the matter, a majority of the directors refused to sign the agreement, claiming that it would be more just to allow the net proceeds to go toward the purchase price. This the owners refused. So the matter stands at present. There will be another meeting of the directors in June, when all differences may be adjusted and operations resumed. The lessees of the Lincoln, who became discouraged on account of the ground caving in consequence of the heavy rains, have re-organized, and started to work again with renewed energy. They are busy fixing up the mill, and in a few days the stamps will be ready to drop. They have found a new stratum of ledge matter, which prospects well, and feel confident of a good run this summer. R. C. Downs and company are running a tunnel into their gravel claim at Humbug hill, and expect to strike pay gravel at an early date. At the Mahoney work is progressing as rapidly as possible. The rock that lay on the dump has been all run through the mill, and carpenters are busy repairing, and putting everything in good order. Miners are at work repairing the tunnel leading to where they expect to get their pay dirt. In another week I hope to report the mill in activity.

NORTH STAR.—Amador Dispatch, May 9: The North Star mine company has ceased operations for good. The original shareholders and the improvement could not come to terms about the extension of time. They have already begun to tear up the track iron that is in the drifts and tunnels; all the improvements will be moved as soon as possible. The closing of this mine throws quite a number of men out of employment.

Calaveras.

HALLOCK.—Mt. Echo, May 7: A free gold or battery test of ore taken from the Pioneer, or Hallock mine, situated near this town, was recently made, the yield of which was \$39.38 per ton. Tests of the sulphurets have also been made which have proved highly satisfactory to the company. The new 20-stamp mill, now in course of construction on this mine, will soon be completed.

Contra Costa.

THE LIME QUARRY.—Contra Costa Gazette, May 9: In the earlier days, that is to say, some 30 years ago, the lime quarry near the present site of Concord was successfully worked by a pioneer resident, Frank Such, and a considerable quantity of lime was burned by him and shipped by way of the creek to San Francisco. He was succeeded by Mr. Gibson, and after him if our memory is correct a party named Allen continued the business for a while. But, as was understood at that time, it competed too sharply with the Santa Cruz product, and the quarry was leased in the interest of the latter and closed down. The term of the lease expired some years ago, but no one has seemed disposed to go into the business of lime burning. Some three or four months ago a gentleman appeared in Martinez and made inquiries for lime rock. He was cited to the old lime quarry, and stated his intention of visiting the spot. Nothing was heard of him afterward, but now that Mr. Wm. Cavanagh has a contract to deliver a large quantity of rock from this quarry to the Selby Smelting Works, this may be the outcome of his visit. The transportation facilities now make it the most convenient point from which to obtain the needed supply, and after the long rest we are glad to note the resumption of operations.

El Dorado.

MILLING ORE.—Georgetown Gazette, May 9: Armstrong & Ritchie have evidently got the boss mine of milling ore. They have been running in on their large ledge steadily for the past month, and every foot of progress has shown a fine grade of milling ore, and now so well satisfied are they with the permanency and extent of the ore that they have determined to equip the mine with a good mill and work it themselves. The mine is not for sale, as the parties command sufficient capital. They have about 400 feet of backs from Dark Canyon where they have started the tunnel. They have an abundance of timber and can run the works at a small cost. All who have seen their developments, say that they have got a big thing.

Inyo.

BIG PINE.—Inyo Index, May 9: The little hamlet has other assurances of future prosperity and greatness from the assurance of the immediate success of a number of mining projects in this vicinity. Mr. John Quillan, who has been associated with Andy Fife of Sylvania notoriety in the development of the mineral resources of Inyo for some time, accompanied by Mr. J. C. Webber of Bodie, is off for the Montezuma mine, intending to sack and ship several carloads of ore from this celebrated property. On our side of the river mining industries at Fish Springs are looking up. The old arrastras are running in full blast, and Mr. Dan Trussell hopes to have his new one soon under the influence of a mountain stream.

Nevada.

W. Y. O. D. MINE.—Grass Valley Union, May 10: The W. Y. O. D. mine will declare a dividend

(No. 3) for the current month, amounting to \$1500. The company has just had a return from the Selby Smelting Works of a lot of sulphurets, which gave a net result of \$250 per ton, the gross product being over \$300 per ton. Preparations for building the company's new ten-stamp mill is making progress. The machinery and a portion of the lumber is on the ground. The building of the mill and other contemplated improvements on the surface will require some months for completion.

CALIFORNIA.—Grass Valley Union, May 7: Some fine looking ore has been taken out of the shaft of the California mine, on Deadman's Flat, since the pumping has been going on, and the same quality of ore shows in the levels that have been drained. The water in the shaft has been lowered 200 feet, and the water will soon all be out. It is the intention then to open up the lower level, and have a test crushing of the quartz. From the appearance of the vein as already exposed it looks as if it would give good milling returns.

NEW ENTERPRISE.—Tidings, May 7: Gold Flat, in Nevada City district, is shortly to be the scene of mining operations that are confidently expected to develop a valuable property. The promoters of the enterprise are well-known Grass Valleyans, including John Glasson, John Skewes of the North Banner mine, T. J. Michell, John M. Thomas and others. Articles of incorporation will be filed in a few days. These gentlemen have bonded four claims or ledges, all of which can be worked through one shaft. These claims are the Mohican, Bruce Lee, Gold Flat and Potosi; and the Bruce Lee shaft, between 200 and 250 feet in depth, has been selected on which to erect the plant, which will be economically operated by water-power. All of these ledges have paid good wages to water level and under the most indifferent—not to use a stronger word—management. The Bruce Lee and Potosi are north and south ledges, pitching east, while the Mohican and Gold Flat are east and west ledges, pitching south. The advantages for working all four through a central shaft will readily be appreciated by mining men. The country rock is slate, as in the Grass Valley district. The capital stock of the new company will be 100,000 shares, of which the old company (owner or owners of the claims named) retain 49,000 and the new company 51,000 shares. It is proposed to place 30,000 shares on the market at 25 cents a share, to be paid in three installments—two of 10 cents and one of 5 cents per share. The capital thus realized will be devoted to the erection of a plant and the development of the property.

CENTRAL NORTH STAR CO.—Grass Valley Union, May 6: The Central North Star Mining Co., which was recently incorporated, whose location is on the south portion of New York Hill, has commenced preparations to open the mine. The first work that will be done will be the cleaning out of the adit level, which is 400 feet in length, the mouth of which is on Wolf creek, a short distance above the Omaha mill. This level strikes the vein which is ten inches in width, at a vertical depth of 200 feet below the surface. It is the intention when the level is put in shape to erect machinery on the surface and sink a shaft on the vein connecting with the end of the level. This vein has given good prospects, and the new company intends to open up the mine in good shape. James Bennallack has been appointed superintendent.

GOLD POINT MINE.—There is a probability of the Gold Point mine soon being started up to conduct operations regularly. The vein is large, from two to two and one-half feet, and can be cheaply worked. The last crushing from the mine gave a yield of \$14 to the ton.

Placer.

THE HOGSBACK CLOSED.—Placer Republican, May 6: The Hogsback mine has closed down temporarily, probably for a year. The cause attributed is that the company will reorganize, and the absence of some of the members from Paris necessitates such a long delay. The gravel in the channel is very rich, but its paucity in quantity has caused the yield of gold so far to be comparatively small. The Red Point drift mine some ten miles farther down the divide is paying satisfactory dividends monthly. The company has over 27,000 linear feet of channel which insures dividends for many years to come. The old Hidden Treasure is still on the list as a good paying mine. A large force of men is constantly employed drifting out the vast deposit of white quartz gravel. Underlying all this section of the divide are many "ancient river beds, but only a few have been discovered and developed. Michigan Bluff has been rather dull for some time past, but a new era of prosperity is about to dawn, for the Deadwood district only a few miles above here is getting to be a lively camp. Outside capital is being invested and the mines are looking prosperous. At the Paragon and May Flower mines active work is being prosecuted and regular dividends are a result. Other properties in their vicinity are being worked, mostly for the purpose of development.

Shasta.

A GOOD MINE.—Redding Free Press, May 9: The Gladstone mine, formerly owned by Osborne, Morrell & Cummings, and which was sold to the present owners, has turned out to be one of the best paying mines in the county. Under the new management the mine has been opened up in a systematic manner. Good and adequate machinery has been put in and every labor-saving device known to mining has been made use of. Not long since, on a run of 21 days, \$14,000 was shipped to S. F., and last week, after a run of 30 days, \$28,000 was cleaned up—almost \$9000 per day. And still there is an abundance of good ore on hand. The French Gulch district, in which the Gladstone is located, has been very productive of gold in the past, and the future seems bright and promising.

Sierra.

A PROSPECT.—Mountain Messenger, May 9: The company sinking the shaft opposite the mouth of "Nigger" Canyon reached the bedrock at a depth of 94 feet, and found a prospect. The shaft was sunk not to work through, but simply to test the ground for gold and depth. An exploring tunnel will now be pushed off at the bottom of the shaft, and if developments are satisfactory, a tunnel will be run to tap the channel at its lower end. It is quite evident that the South Fork once ran in the channel where the shaft is sunk, and that an immense land-slide came from the hill to the North, forcing the river out of its then bed and forming what is now Fournier's Flat.

EXTENSION.—Superintendent Meikle, of the B. M. Extension mine, is expediting the work of getting ready to take out and wash gravel, as much as possible. He has only been able to find room for a few men in addition to the force he has been employing. Among the first things to be done is the building of a reservoir to catch the water flowing from the tunnel, the building of a large dump, putting the blower in place, etc. It will be some little time before lumber can be got as it will have to be specially cut. At present a team can get within about half a mile of the tunnel mouth. Two of the upraises in the tunnel have been connected by a drift, primarily to secure a circulation of air, and for the purpose of prospecting the gravel, which was found to contain good pay.

STRUCK RICH GRAVEL.—Maple Grove Mining Co. has struck it rich. This claim has been prospected through a shaft, and the gravel contained \$10 a carload. Three hundred feet of channel of the finest looking gravel that has been seen since the old blue lead days. This is supposed to be the deep lava channel which was crossed by the B. M. Ex. old tunnel just below the incline. The company is about to start a tunnel to tap the channel. This claim is located about two miles southeast of Forest City. This find together with the opening of the Extension, is liable to bring Forest City to the front again. The above is the first intimation we have had that any prospecting was being done for this channel, which is none other than the lower channel worked by the Ruby Co. If the Maple Grove Co. have found this channel, and have any great amount of ground, it has a good thing. The Extension Co. owns nearly 3000 feet of this channel next below the Ruby ground; the South Fork Co. owns probably as much more of it, adjoining the extension ground, on the south; and it has long been our opinion that this channel crosses a portion of the Mammoth Spring Co.'s ground. If the southern end of this channel has been discovered, we do not see anything to prevent the owners having a very valuable property, and one that can be economically worked.

Siskiyou.

COAL.—Yreka Journal May 6: Henry Harris brought to town last Friday some more samples of superior coal from Willow Creek, the coal lead improving in quality, the more it is developed. The mine has been opened to a depth of over 70 feet, disclosing a bed from four to five feet thick, with, considerable water, to require the steady use of pump. This coal discovery in Siskiyou is destined to prove a source of great wealth to the owners, and will induce prospects in various other sections, where croppings of shale and coal are visible.

GRAVEL.—Lee, Lash & Co., have their new machinery in position for hoisting blue gravel at their Greenhorn claim, also the steam pump, and are now getting out the pay gravel to better advantage, the only drawback being a slack up in the water supply for operating the sluices to best advantage. The claim was all pumped out again Saturday and work was resumed in the drifts on Sunday night, with day and night shifts now working steadily.

A BIG STRIKE.—For a number of years, miners prospecting on the north fork of Hiyou gulch, have noticed a large ledge of quartz, which cropped out of the surface of the ground. They generally tested it and pronounced it worthless, consequently it has remained unlocated until recently, when two of our most enterprising men, H. C. Chester and J. E. Williams placed their notice of location upon it, and commenced work. Mr. Williams, who is a miner of no little experience, conceived the idea of tapping the ledge about 20 feet under ground by running an under-cut. After two months' incessant toil, he struck the ledge on the 27th inst., and to all appearances, struck it rich as well, for the quartz, which prospected so little on the surface, prospects at from \$15 to \$25 per ton where it has been tapped. The ledge is four feet wide and easily worked, therefore if it will pay \$10 per ton on an average, it will prove to be the richest bonanza ever yet discovered in Siskiyou county.

Trinity.

THE YELLOWSTONE.—Trinity Journal, May 9: T. J. Houghton, Superintendent of the Yellowstone mine, was in town this week and reports everything at the mine running smoothly and the output of bullion very satisfactory. Mr. Houghton is a thorough mining man and has made a success of every enterprise he has conducted. The Yellowstone, under his supervision, has been made a success and now ranks among the best quartz mines of the county, giving employment to a large force of men.

Tuolumne.

SUGAR PINE DISTRICT.—Cor. Tuolumne Independent, May 9: In last week's issue of your valuable paper I noticed an article on the Sugar Pine Mining district. For information to old-timers and present Tuolumneites, I will give you some items that will astonish a good many as to what has been taken out of this rich mining district, and will show that it still has a good outlook for one mile square. The Excelsior mine had the largest receipts, as far as can be learned, and are as follows: Gold shipped to Bank of California—W. Ralston's receipts, \$128,921; Wells, Fargo & Co., \$215,344; Sleeper & Co., \$80,000; total, \$424,265. From the Mount Vernon it is estimated that over \$50,000, and from the Green mine over \$44,000 were taken out. The Pacholke & Jasper mine is now bonded for \$30,000. The First Extension Green mine is looking well. The owner is sinking a shaft on the vein, which is looking very encouraging. Work on the Lillie Prouse mine will soon commence. As soon as water can be brought on the Jim Claim mine it will undoubtedly show up well, as the rock now prospects from \$80 per ton up, in free gold. Then comes the largest mine in Sugar Pine district, situated east of the Green mine, and owned by Dooly & Ryan. It is a sulphuret vein, ranging in size from 6 to 12 feet in thickness, and crops out on the surface in places, four and five feet high. It was originally owned and worked by an old prospector, Fred Greiner, Sr., who took out considerable gold, down near the river, but for some reason unknown to the writer, abandoned it years ago. So you see that for a mile square, Sugar Pine Mining district shows up as well as any.

THE KELTZ MINE.—Union Democrat, May 9: The Keltz mine situated northeast of Sonora, about 12 miles, has been sold to an English Co. It was bonded to the company and has been under development by them for several months. They are

well satisfied with the results and the sale has been consummated. Mr. Leachman lately arrived in S. F. from London. He negotiated the sale in England. The mine has a good 10-stamp water mill on it. The capacity of the mill will soon be increased by additional stamps. The ores of this mine can be mined or milled at small cost per ton. The ore shoots are reached by tunnel and all the machinery is operated by water power.

Yuba.

MINING AT SMARTSVILLE.—Grass Valley Union, May 10: Mr. Turner is getting things in shape for an early commencement of work in the Golden Gate mine at Smartsville. A considerable force of men will be employed when the drifts are properly opened.

NEVADA.

Washoe District.

YELLOW JACKET.—Are doing extensive prospecting work throughout the mine.

ALTA.—Steam is up and have resumed exploring work.

BELCHER.—The south drift from No. 2 east crosscut, 200 level, is out a total distance of 230 feet, face in quartz and porphyry, containing occasional bunches of ore. The north drift from the main west crosscut from the shaft, 300 level, is out 66 feet; face is in low-grade quartz and porphyry. The east crosscut from the south lateral drift on the 1500 level is out a total distance of 87 feet; the face is in hard porphyry.

CROWN POINT.—Have stopped the south drift on the 300, eleventh floor, and started a north drift from this stop on the same floor; face is in low-grade quartz. The 1000 level east crosscut is out 57 feet, having been extended 16 feet during the week; the face is in porphyry, with streaks of low-grade quartz through it.

CHALLENGE CON.—The joint Confidence and Challenge west crosscut from the north drift on the 300 level is being repaired. The joint Confidence and Challenge east crosscut on the 600 level is out 27 feet, 4 feet having been made during the week; the face shows clay. This crosscut has been stopped for the present. The joint Confidence and Challenge west crosscut, same level, is out 10 feet, having been commenced during the week; face shows quartz having no value. The joint Confidence and Challenge north drift on 1100 level is in 211 feet, 22 feet having been made during the week; the face being in porphyry. The joint Yellow Jacket, Confidence and Challenge north drift on the 200 level is in 720 feet, 11 feet having been made during the week; face shows quartz having no value. The joint Challenge and Imperial west crosscut, 300 level, is out 90 feet, 14 feet having been made during the week; face shows quartz having no value.

CON. IMPERIAL.—We are still following up and taking out small streaks of ore on the upper levels and prospecting in and around the old stopes, where we find some fillings and bunches of ore of fair grade, which is being shipped to the Vivian mill for reduction.

SEG. BELCHER.—On the 600 level the west crosscut from the south lateral drift reported as having been started last week, is out a total distance of 26 feet. The face is in soft porphyry.

KENTUCK.—Have stopped the west crosscut from the south drift two floors above the 1000 level, and started a raise from the south drift. The top is in low-grade quartz. Have raised 9 feet from the 1000 north crosscut, and are up a total distance of 37 feet. The top is in low-grade quartz. Have advanced the drift from the top of the raise in the west ledge 9 feet. The face is in quartz assaying from \$6 to \$12 a ton.

JUSTICE.—No work was done in the south winze on the 400 level during the week, as it is the intention to raise from the 622 level to connect with it. The north drift on the 822 level is out 663 feet. The face is in ore of fair quality. The upraise 300 feet south of the switch on the 822 level is progressing well, with favorable prospects.

CHOLLAR.—The south lateral drift from the north line, 1400 level, is out 107 feet; face in hard porphyry. Joint east crosscut on the north line, 1400 level, is out 105 feet; face in porphyry.

POTOST.—The south lateral drift from the Chollar incline, 1100 level, is out 120 feet; face in porphyry. South lateral drift from the winze station, 1300 level, is out 120 feet; face in quartz and porphyry. The winze is down 51 feet below the 1400 level; the bottom is in porphyry.

NEW YORK.—North lateral drift, 650 level, is out north of shaft 186 feet; face in porphyry. North lateral drift, 1100 level, is out north of shaft 468 feet; face in quartz yielding low assays.

ALPHA AND EXCHEQUER.—But little work has been done in the above mines the past week, owing to repairs to the shaft.

CON. VIRGINIA AND CALIFORNIA.—Virginia Chronicle, May 8: Exploratory work on the 1100 level of Con. Cal. & Va. was resumed yesterday. It is intended to prospect the ground thoroughly to the east and west of the south drift, where the upward extension of the ore vein from the 1200 level was found, for it is believed that there are some outlying bodies of ore in the vicinity. The prospects of the west side are especially good. The main south drift from the old Con. Cal. & Va. shaft has been carefully timbered, the requisite ventilating machinery has been put in, and everything is now in readiness for an energetic campaign in the big block of ground never before opened. Other parts of the mine are looking well. Ore shipments to the Morgan mill will begin at the close of the week. The Eureka mill is now being cleaned up, and a large hullion shipment to close the April account will soon be made. As two mills will soon be running regularly on Con. Cal. & Va. ore, the hullion product of the mine will be more than double what it has been.

SILVER HILL.—Northwest drift, 50-foot level, is out from the shaft 160 feet; face in porphyry. North crosscut, 160 level, is out from the winze 730 feet; face in hard porphyry.

WARD COMBINATION SHAFT.—The east drift from the 1800 station is out 963 feet; face in porphyry.

SAVAGE.—We have hoisted 426 cars of ore from the 500, 750, 800, 900, 950 and 1000 levels and from the north and south drifts from the winze below the 1300 level. Shipped to the Mexican mill 5364 tons and milled 530 tons; average battery assay, \$17.50. We have hullion on hand amounting to

\$29,566. From the east intermediate drift below the 1300 level we are sinking a winze which is now down 23 feet. This winze will connect with the 1300 level north drift, which will improve the ventilation and enable us to prospect this section of the mines. On the 1400 level we have drifted north 29 feet on the ore, which continues to improve, and is being saved for pay.

HALE & NORCROSS.—On the 1400 level No. 4 west crosscut near our north boundary was advanced 10 feet; total length, 225 feet; face is in porphyry. The winze from the end of No. 3 east crosscut is down 60 feet; the bottom is in quartz. We have cut out a station and started an upraise on the 900 level, about 80 feet south of our north boundary line for the purpose of prospecting the ledge in that section of the mine. The main incline is being repaired and retimbered below the 1300 level, to enable us to construct a station and chutes. Have men on repairs in the main shaft and on different levels wherever necessary.

UTAH.—725 level engine station at the top of winze has been completed, and we are now putting in a hoist engine. A chute will be cut out at the top of the winze for the incline car to dump into. It will be completed in four days, and sinking in the winze will be resumed.

BEST & BELCHER.—1000 level: Cleaned and repaired 60 feet of northeast drift during the week. 1100 level: The northeast drift has been advanced 24 feet through porphyry and stringers of quartz; total length, 149 feet. Have cleaned and repaired west crosscut No. 1, 42 feet.

GOULD & CURRY.—200 level: Resumed work in the north drift and extended same 20 feet; total, 185 feet. Sunk winze No. 2, 40 feet east of winze No. 1, 30 feet through ore of a fair quality. Extracted during the week 106 cars of ore. Received from ore milled at Nevada mill \$11,406.03.

ANDES.—On the 420 level east crosscut from south drift has been advanced 24 feet during the past week; formation, vein porphyry. East crosscut from the north drift on the 420 level was extended during the week 25 feet; formation, quartz and clay.

Tuscarora District.

DEL MONTE.—*Times-Review*, May 8: Joint crosscut west has been advanced 25 feet. Joint raise from this crosscut has been started.

NEVADA QUEEN.—South drift from the east crosscut, fourth level has been run 15 feet in vein giving low assays.

COMMONWEALTH.—Fourth level: North drift from the east crosscut has been advanced 30 feet in the vein, showing quartz and spar, assays \$3 to \$15 per ton. East crosscut has been extended 24 feet, still cutting small seams but nothing of value. Have started to extract ore from 100-foot level.

BELLE ISLE.—The prospecting winze from the intermediate crosscut from No. 1 chute, 350-foot level, has been extended 8 feet, the ore continues of fair width and high grade. South intermediate drift, same place, extended 5 feet. East crosscut from top of No. 2 chute extended 18 feet. Work has been resumed in the west crosscut on the 350 foot level, to tap the ore showing in the prospect winze; progress 4 feet.

NORTH BELLE ISLE.—South drift from east crosscut, 400-foot level, extended 21 feet, total 41 feet. The face continues to show several strata of good ore; have started a stope over this drift, showing some good ore. Have broken 7 cars of first class and 78 cars of second class ore. The stopes from the north intermediate from No. 4 chute, 600 level, continue to yield high grade ore.

NORTH COMMONWEALTH.—First level: There is very little change in the stopes, the ore extracted and going to the mill, battery assay \$243 per ton. Union mill started crushing on the fourth instant (Monday). Battery assay \$243 per ton. Have crushed about 100 tons.

ALASKA.

PLACER MINES.—Juneau *Mining Record*, April 26: Work on the Silver Bow Basin Mining Co.'s property is progressing as rapidly as possible and by the time snow disappears everything will be in complete readiness for operations on an extensive scale. At a depth of 60 feet gravel was struck which prospects far beyond the most sanguine expectations of those familiar with Basin properties and it is now thought by those who are in a position to know that the tunnel will not tap the Basin at a sufficient depth to work the gravel at bedrock. This company has expended a large amount of money in opening this property and the work has been executed in a substantial and first-class manner and will stand as a monument of thorough and practical workmanship to Mr. Joseph Farnworth, the superintendent. The striking of good pay gravel at such a depth is recorded by the *Mining Record* with a great degree of satisfaction and will set at naught the communications published in the *New York Engineering and Mining Journal*, and written by irresponsible amateur mining men, so-called, whose only aim in life appear to be to bring the industries of the community wherein they live into disrepute in order that they may gain a little cheap notoriety. However, the time is not far distant when the merits of this property, which no one conscientiously questions, will be made known to the world. During the week a party of miners returned from the placer mines which are being opened in the Shuck district by a syndicate of gentlemen with Mr. John A. Bernhardt as promoter. These were the first placer mines worked in Alaska and at one time comprised a flourishing little camp but were abandoned on account of reported rich strikes in other sections of the territory, and also on account of the expense attached to a thorough and practical working of the same. The placer ground lies in two basins known as the upper and lower basin. The lower basin is in close proximity to the beach with a ridge separating it from the bay. In order to tap this basin at a depth of 65 feet required the driving of a tunnel for a distance of 700 feet. This tunnel is 7x7 feet with a fall of 4 inches in 12 feet and is located about 18 feet above high water. For the working of this property nature has furnished a bountiful supply of water which has been gathered up in ditches and flumes which lead from what is known as Spruce creek, at a point about 400 feet above the surface of the gravel deposit. This basin contains about 60 acres and embraces three claims of 1500 feet in length and 600 each in width. The upper basin is about 1000 feet above high water mark and contains about 20 acres. This basin is tapped by a small

tunnel about 100 feet in length, and through which a flume 28 inches in width runs.

ARIZONA.

NOTES.—Prescott *Courier*, May 9: Tip Top district miners are now shipping pretty plenty of ore to El Paso, Texas. Supplies are leaving Prescott for Bradshaw district, where the Crowned King mill is doing better work than ever before. The Tiger mine is looking fine. Mill will be started very soon. There are three mills running in Hassayampa district, the Senator, the one in Maple gulch, and Harlan's. All crushing gold rock. Aztlan mill, in same district, will soon be going. Turkey creek mines are sending in ore that goes from \$200 to \$800 a ton. More men are to be put into the Hackberry, Big Bug district. United Verde mines and smelters are behaving admirably. Many men say the district is the best in the mountains. The Catocin mine is producing good ore. It has paid from the grass roots.

CONGRESS.—F. M. Murphy, superintendent, and Mr. Church, foreman, arrived from the mine yesterday. Good ore is overflowing every bin and thing in and around the mine. Some of the ore of the Congress mine is said to contain 17 ounces of gold to the ton. The vein is strong at a depth of over 700 feet. Mr. Henderson of Walker district tells us that Mr. Ritchie, late of Colorado, is making the Dixie company's Wiswell mill do good work. He runs the mill steadily on free gold rock. B. A. Taylor, superintendent of the Quartz Mountain, and John McKinnin, the foreman, tell us that at a depth of 200 feet the mine is looking well. Plenty of good ore in sight. O. F. Place and N. C. Shelds, of the Crowned King, are in Prescott. Mill has been doing good work. Several hars of gold were recently sent East from the mill. Joe Howell and other miners are off for the Hillside district to take out ore and ship it.

RICH STRIKE.—Mohave *Miner*, May 9: Since the water has been pumped out prospecting has been commenced on the 150-foot level of the C. O. D. mine, and an important strike of rich ore has resulted. A portion of the hanging wall has caved off in one of the drifts, owing to the ground becoming softened by the water covering it, and exposed two streaks of ore averaging about eight inches each in width. The mine has never been thoroughly prospected and this unexpected strike will give a new impetus to the work of development. The mine has been a great producer, and is now in the hands of energetic young men who will not let a temporary pinching out of the ore deter them from the ultimate point in view—the thorough prospecting of their property.

COLORADO.

RICHER THAN EVER.—*Aspen Times*, May 7: The latest rich strike of ore has just been made in the famous Aspen mine. Stephanite in ton lots has been struck in the sixth level. Several tons of this rich ore have been extracted that run from 5000 to 10,000 ounces per ton. Dr. Paul, manager of the Aspen, has promised a 200-pound piece to be placed on exhibition at the Mineral Palace to-morrow, where people can see what richness is in store for them in the deep workings of the great mother contact.

THE HOLDEN WORKS.—Ed R. Holden, of the Holden livery works, is in the city and stated to a *Times* representative yesterday that his company would commence huying low-grade ores in July and that all the contracts had been let to have the works completed to a 120-ton capacity in the latter part of August, and that the capacity would be increased as fast as a demand was felt. This will be a great boon to Aspen and the proposition can be enlarged to 500 tons a day.

DAKOTA.

REDUCTION OF TIN ORE.—*Lincoln Journal*, May 7: People who scoff at the probability of seeing American tinware made from ore from the Black Hills will be a little discouraged to know that Mr. F. C. Sholes, of this city, has received a letter from General Manager Wicker, of the Harney Peak Company, giving a full account of the preparations that are progressing rapidly for beginning the reduction of ores on a large scale. Orders are out for all the machinery needed and it will not be long before the hock tin from these mines will be in use in half a dozen American factories. The facts about the Harney Peak mines have been rather slow in coming out, but it has nevertheless been known in Lincoln for a couple of years that the widely advertised failure of the first attempt to smelt these ores was not a failure at all, but a shrewd device of the London owners of the mine to gobble all the desirable mines in the vicinity at their own prices. Now they have bought up all the property that can be had, and are ready to demonstrate that they have one of the most valuable tin mining properties in the world.

BEAT THE RECORD.—*Deadwood Pioneer*, May 8: The cleanup of the Deadwood chlorination works for April went east Sunday, and for the number of days run, beats the record. The total number of days run was eighteen, and the value of the cleanup a little over \$14,000. The last six days run netted \$7,800.

IDAHO.

CUMBERLAND.—*Avalanche*, May 2: The Cumberland mine, on War Eagle mountain, owned and worked by Mr. Jas. Shaw, is making a better showing than ever before. It is a vein running parallel with and about 100 feet west of the once celebrated Golden Chariot and carrying ore very similar in character, but the bullion running slightly higher in value per ounce. Messrs. Shaw and Kennedy are now stopping ore from a chute found in the tunnel and have out a big crushing which they will have milled as soon as the road to the mine can be opened. The rock now out is estimated to be worth about \$200 per ton. It is rumored that this mine will change hands in a few days, as parties now hold an option on it at figures which justify them in closing a trade.

STORMY HILL.—Orders have been received from the owners to start work again on the Stormy Hill mines. The foreman, Simon Harris, has again got up steam at the hoist and begun taking out ore. The outlook at the mine when they shut down in

the winter was so very good that much surprise was expressed at work being stopped, but timbers could not be procured and other disadvantages under which work was done, probably justified their stop. As the shaft went through about 60 feet of high-grade ore, when they now begin stoping we expect to hear of good results. It promises to be a good producer.

SEAFOAM DISTRICT.—*Ketchum Keystone*, May 9: The *Keystone* was favored by a letter this week from Johnny Foster, who left here last fall to winter at Seafoam and do development work on mines there owned by himself and James Judge. He writes that he has taken out eight tons of first-class ore that will go from 200 to 400 ounces of silver per ton, and has about six tons more in sight. He has also made a location which he is sanguine will prove very valuable, as it is favorably located and opens out with highly flattering surface prospects. A rich strike was made in the Blackhawk mine last week. Mr. Foster, with the help of one man, John Honan, has run 100 feet of tunnel, sunk a shaft 30 feet, and run a stope 40 feet in good ore from ten inches to two feet thick, all in less than five months, which we regard as pretty good work for two men.

DE LAMAR.—*Vulgar*, May 5: The new manager, in assuming control of the great De Lamar mining property, has not, as some feared he would do, made any radical changes in the employees. Naturally enough, he has selected chiefs of some of the departments from among men whom he has personally known before coming here, and each of these have made some few changes among those working under them, but of the old men very few have been let out. Mr. William Rickenburg has been placed in charge of the mill. He is an experienced amalgamator, whom Captain Plumer has formerly employed in Montana. Mr. Thomas H. Oxnam, who has also for several years past been employed by Captain Plumer, has been appointed foreman of the mines. Some few of the old employees quit work on the 1st inst. when the changes were made, some to go prospecting or to work mining claims, and the places of these have been filled by new men; and in a very few instances men have been let out. Mr. Robert McAfee, who has been running the tramway from the time it was completed, has been put in general charge of the machinery at the mines and mill. Mr. Wm. Houtz, as formerly, remains in charge of the carpenter and construction work.

FLINT.—The experimental work done at the Flint mill with concentrators last fall, was sufficiently satisfactory to warrant its continuance. Mr. Leech has ordered that the mill be started up again at once, and will add ten more stamps and more concentrators to double the capacity. Miners will in a few days be put to work on the Last Chance mine, which, it is expected, will be able to supply the mill with better rock than that worked last fall.

DISTRICTS TRIBUTARY TO HAILEY.—*Wood River Times*, May 6: Pat Hannigan is shipping a ten ton lot of ore from the Mountain View. The Red Elephant will ship ore as soon as the road from the mine to Crov gulch is open, which will be in a few days. All the leasers on the Jay Gould are taking out ore. The boys have done well during the past winter. This mine has been worked two years on a lease, during which time it has paid continuously. It was originally opened up and operated by Warren Hussey, the well-known banker, who built a concentrator on the property in 1883, and a week or two after the completion of his plant shut down the mine and works, having no ore in sight. This is a notable instance of the folly of gouging out an ore body without prospecting your ground. One hundred dollars worth of development would have put him into a chimney of rich ore that would have lasted for years. When the hoisting works are completed on the Nettie, this mine will join the ranks of the ore producers, and will materially augment the already encouraging output of ore from Deer Creek.

MONTANA.

THE PENN YAN.—*Mining Journal*, May 9: Some three years since the Penn Yan Co., after making a phenomenal record in the production of ore, was compelled to shut down its mine, the Penn Yan, located about five miles from Wickes, owing to the workings unexpectedly encountering a large quantity of water. Recently a tunnel has been driven on an adjoining mine, the Blue Bird, which resulted in draining the Penn Yan enabling the company to renew operations, which were so vigorously pushed that on yesterday seven carloads of pay ore were shipped to the smelter, which will be pleasing information to the stockholders, who may look forward to continued shipments. The Blue Bird is also extracting some good ore in the development work, and doubtless will soon begin ore shipments.

HIDDEN TREASURE.—Word came from Castle yesterday that a rich strike was made in the Hidden Treasure.

CUMBERLAND SMELTER.—Work on the Cumberland smelter is rapidly approaching completion and it is hoped that fire can be blown in by the 20th inst.

A NEW DISTRICT.—What promises to prove an important mining district is being opened up on the Lost Fork of the Judith, about 18 miles from Neihart, where O. E. Berg, Doc Potts and others are developing the Sweepstake and Cliff lodes. Assays from these claims return from 150 to 200 ounces silver and from 50 to 60 per cent lead. The ore is a hard carbonate in a formation of limestone and slate. A crosscut tunnel is now in 320 feet and it is anticipated the lead will be struck within 60 feet more.

RIVER DREDGING.—*Billings Times*, May 9: The latest placer mining venture is the big dredge boat now approaching completion on the Jefferson river. It is 90 feet long by 30 feet wide, and fitted with dredging and amalgamating machinery. It will hoist from the river-bed about 1500 cubic yards of sand and gravel daily and save all the gold contained therein. Ex-Gov. Tabor of Colorado is largely responsible for this innovation, and if it is successful several more such boats will be put in. There suit will be that the beds of the Jefferson, Madison and Missouri rivers will be worked out for many miles and if it pays there it will also yield large profits on the Big Horn and Stinking Water.

NEW MEXICO.

PYRAMID.—*Western Liberal*, May 8: The Pyramid company is resetting the amalgamating pans

torn out of the mill some years ago by Superintendent Burns. Mr. Hamilton finds that the concentrators do not take a satisfactory amount of the ore, but that it takes out all the base, leaving the tailings in good shape to be amalgamated. He will thus be able to get the value of the ore without the old expensive method of roasting. In resetting the pans considerable quicksilver was found which had been lost when the pans were in use before, and the mercury has been found all over the mill, showing that considerable had been lost when retorting, and had been precipitated as metal in out of the way places. The amount found was about 70 pounds.

SHIPPING ORE.—*Silver City Enterprise*, May 8: The Teal-Poe mining company of Cook's Peak is shipping on an average five cars of ore per week, which averages 60 per cent in lead and about \$7 in silver. Recently a very extensive body of sand carbonates have been uncovered in the mine, which at the present time is showing more ore than any other property in the camp. At present the indications are that the supply of ore is almost inexhaustible. The owners of the mine adopted an innovation in the formation of their company by taking Lawyer Ashenfelter into the company. The majority of the owners of rich mines employ legal ability to look after their business with the result that in the end the mine falls into the hands of the attorneys.

OREGON.

THE GREENHORN MINES.—*Bedrock Democrat*, May 8: Carpenter Brothers have moved down to their Greenhorn hydraulic mine on Greenhorn Gulch, and intend operating two pipes just as soon as water starts sufficient to handle their giants. The quartz miners have lots of water to contend with on account of melting snow, which makes it had for their work, yet they are still hanging on and think of their costly mansions and brown stone fronts "in the distance." John Platt is now at work on the Greenhorn mountain. He is the discoverer of the Polar Star on the northeast side of Silver hill, which is a part of Greenhorn mountain. The Polar Star quartz claim is very rich in silver. Mr. Platt is driving a tunnel to tap the mine at a greater depth than attained by the original work done the year of discovery. He shows great energy for one of his age, having worked alone all winter, and his tunnel is about 100 feet.

OUTLOOK DEMOCRATIC TIMES. May 8: The mining outlook for Baker county during 1891 is better than for many years past. There appears to be more confidence displayed in the richness and permanency of the mines than ever before, the result of many years' struggling on the part of honest miners, who have toiled ceaselessly to bring their properties to a state of development that leaves no doubt of their value.

UTAH.

THE DEEP CREEK EXCITEMENT.—*Tintic Miner*, May 9: That there is mineral in the Deep Creek country, Dugway and other points lying south and west of Tintic, we have not the least doubt. There are, however, circumstances connected with this same Deep Creek country, that when known, should cause those miners, who are without means other than their ability to perform a day's labor, to pause and reflect before rushing to a country of which they know nothing except the sensational and exaggerated reports which invariably follow the opening up, or discovery of mineral in all new districts. In the country west of us, bordering on the Desert there is virtually no water fit for human use, while provisions are scarce, dear and very difficult to be obtained. Then again there are very few, if any, mines developed so far as to offer employment to any considerable number of men. We do not wish to detract from the value of the mineral field of Deep Creek or vicinity, but to warn the poor, hard working miners of the country against the dangers, hardships and privations, that must inevitably result as a consequence to any mad rush to a new and untrodden country, more especially when that country is little more than a barren desert. Three men walked into Eureka from Deep Creek and Dugway, a few days ago, and gave a most deplorable account of the hardships they endured in that country. They reiterate the statement made above as to the scarcity of water, provisions and accommodations of every kind, while they emphatically state that it was utterly impossible for them to obtain employment of any kind. Their names are Oscar Wilkins, Sidney Worsley and A. H. Graham, and by their general appearance and conversation they impress us as honest, hard working and truthful miners. When capital has so far developed the country under discussion, as to make it safe and profitable for miners to go there, it will be time enough for any such rush as is now being so extensively talked about. There is a vast field here on the great lime and quartz belt of Tintic, where capital can find safe and profitable investment, and where eventually the hardy toilers of the mountains and foothills will find steady, remunerative employment. Water, fuel and all other accommodations necessary to the comfort and happiness of the mining community are found in sufficient abundance to insure the people against want, while the old mines at work and the new ones being opened up, are a sure guarantee of great wealth and prosperity for the district now and in the future.

WASHINGTON.

EVENING STAR.—*Okanogan Outlook*, May 7: The Evening Star is developing into a splendid property. The shaft is now down 40 feet, and in sinking that distance the ledge has increased in width from six to 11 feet, five of which is well mineralized. The mine is located on the opposite side of the creek from the Lone Star and is supposed to be an extension of the Toughnut lead. The John Arthur mine is to be quite extensively developed this summer. Mr. Robison, one of the owners, is now on the ground getting things in shape for business. The mine is located about a mile up the creek from Concomely and is the extension of the Lone Star lead, which it joins on the north. There is already a 40-foot shaft on the mine, and several tons of good ore on the dump. J. M. Pitman is doing some development work on the Linnet, a very promising gold prospect on Palmer Mountain. Mr. Pitman was in town yesterday, and showed us some beautiful specimens of ore, some of which contained lots of free gold.

MECHANICAL PROGRESS

Philosophy of the Bessemer Process.

Steel is really a carbide of iron, and Mr. Bessemer founded his process of making steel by blowing out the excess of carbon from the iron, so that the proper amount, 1.5 per cent, should remain. A brief summary of the Bessemer process may be interesting. If a bar of steel as soft as iron be made red-hot and plunged into cold water, it will become very hard. If it be gently heated, it will become less hard, and is then fitted for surgical instruments. The various shades of steel are carefully watched, the change of color being due to the varying thickness of the oxide, for we know that when light falls upon very thin films of a substance, soap bubbles, for instance, the light reflected from the under and upper surfaces interfere and cause color, which varies with the thickness of the film. These colors in steel correspond to different temperatures, and the "temper" of the steel depends upon the temperature it has reached. The color and uses of various kinds of steel range all the way from faint yellow, for lancets, etc., to dark blue for hand-saws.

The Bessemer process transfers the metal into a vessel in which there are tubes, through which air is forced, which produces a much greater heat than a bellows does. Thus, in the process, the carbon of the iron acts as fuel to maintain the fusion, and at the same time, by the huddling of the carbonic acid, mixes the molten iron thoroughly. During the huddling up of the whole mass of iron, and the extreme elevation of temperature, caused by the union of the carbon of the impure iron with the hydrogen of the air, the oxide of iron is formed, and as fast as it forms, fuses into a sort of glass. This unites with the earthy matter of the "impure" iron, and floats on the upper part as a flux, thus ridding the cast iron of all its impurities, with no other fuel than that contained in the metal and in the air used. When the flame issuing from the converter contracts and changes its color, then the time is known to have arrived when the iron is decarbonized. The amount of carbon necessary is artificially added, ebullition takes place, a flame of carbonic oxide comes out, and the metal is then run into ingots.—*Popular Science*.

Testing the Wire-Wound Gun.

The public test of the Brown segmental-tube wire-wound gun, one of the latest inventions in ordnance, has just been made at Fort Wadsworth, on Staten Island. The special object of this test was publicly to demonstrate the high pressures to which a gun of this type can be subjected safely, far in excess, as the inventor declares, of what guns of other types can endure.

The test was of a cylinder 20 inches long, corresponding exactly to a section of a complete five-inch Brown gun. The segments of which the inner tube of the gun is built up, as a barrel by its staves, are 72 in number; this inner tube is wound with 29 turns of wire at a tension of 50 tons to the square inch. At each end of the tube thus constructed for experimental purposes was sunk a steel cap, and into this was screwed a breech plug. The cylinder was thus entirely closed with the exception of a small vent large enough to admit the electric wire by which the charges of powder were exploded, and the pressures obtained were measured by gauges screwed into the inner face of one of the breech plugs.

The program was to explode successive charges of powder within this closed section of a gun, beginning with a charge of two pounds and increasing till a charge of five pounds was reached, expected to give a pressure of over 50 tons to the square inch. The first two were successfully attempted, but after the third it was found impossible to unscrew the breech plug, showing that the tremendous power of the gun must have fractured the inner casing, and forced or fused the threads of the screw by which the breech plug was screwed on. This was done with a charge of three pounds one ounce, and the pressure that was estimated to result from this was over 60,000 pounds. The inventor, James Hamilton Brown, and Lieutenant G. A. N. Whistler, who had charge of the test, considered that, notwithstanding this mishap, which they say does not affect the principle involved, the value of the gun was fully shown, for such pressures had never before been attained in ordnance.—*New York Tribune*, March 29.

THE TREATMENT OF WIRE ROPES.—There are various ways of treating wire ropes, with a view of their better preservation; but we are not aware that the method recommended by a German engineer are generally known. One method recommended by him is to hold graphite in tallow, and to apply this butter-like mixture either with a brush or to let the rope run through a vessel of trumpet-form filled with the grease. The lubrication has to be repeated about every four weeks. It is said that this treatment is a protection against rust, and prevents abrasion when the rope comes into contact with hard bodies or substances. Graphite grease also prevents the rubbing of the several wires against each other, as it finds its way even into the smallest interstices. Wire ropes cannot be piled like hemp ropes, but must be

laid on the ground in wheel form. To preserve them, the following means may also be adopted. Crude linseed oil is mixed with vegetable tar, and applied to the rope. The mixture forms a protective coating, and reduces wear and tear. In order to preserve wire ropes under water or below the surface, a composition of 35 liters of slaked lime, and from 50 to 60 liters of mineral or vegetable tar is recommended. The mixture must be well hoiled and applied hot. Galvanized wire ropes should never be used as driving ropes. After 24 hours' use, the tin coating is worn off, and the rope soon begins to rust. Great care should be bestowed upon the pulleys. The grooves should be always clean, and the materials with which they are lined—wood, leather, india-rubber, or soft metal—must be of the best quality and durable, in order to lengthen the life of the rope and increase adhesion. Steel ropes are excellent substitutes for iron ropes where lightness or greater strength are considerations.—*Iron*.

A SENSIBLE INNOVATION.—Railroad economy has at last attacked the brass ornamentation of the locomotives, and hereafter all the principal railroad companies in the country will use painted wrought iron and blued steel where formerly burnished brass reflected and multiplied the rays of the sun. The new departure will cause a material saving in the labor of the engineers, the number of extra wipers employed about the shops and the original cost of the locomotives. The late Franklin B. Gowen, while President of the Reading Co., was the first to appreciate the great waste in the profuse use of brass, and he greatly reduced the quantity on all new locomotives built. It is only recently, however, that the use of the metal has been almost entirely abolished, and where formerly a locomotive looked as if dressed out for a holiday, there is to-day nothing but sombre black, giving the machine a very business-like appearance. The Pennsylvania Railroad Co. has also built all its new engines without any conspicuous brass ornaments. Freight engines were the first to begin the economy, which has now extended to locomotives of all classes. One of the officials of the company, in speaking of the change recently, said: "The use of the brass was expensive in many ways. It increased the original cost of the locomotive, took up the time of the engineer and fireman to polish it, besides the work of a large force of wipers in the round-houses. These wipers are now done away with entirely, and the engineer and fireman can clean their engine with a few passes of waste. The new departure has been coming into operation gradually. Old engines were not altered, but they were replaced by better and more business-like machines."—*Philadelphia Record*.

A TEST OF THE SERVE RIBBED BOILER TUBES. A test of the superiority of the Serve ribbed boiler tubes has recently been made at the works of the Samuel L. Moore & Sons Co., Elizabeth, N. J., which has shown a large gain in capacity and economy by the use of the tubes. On the forced draft trials, a pressure of seven-eighths inches of water was used, and the boiler evaporated a third more water in a given time, when fitted with the Serve tubes, than when fitted with the plain tubes. With the plain tubes, the pyrometer showed a temperature of the escaping gases exceeding 1200°. With the Serve tubes, the temperature did not exceed 740°. Further trials were made on April 23d and 24th, to see how strong a draught would be required to bring the temperature of the escaping gases up to the temperature which they had with the plain tubes. A full account of the tests will soon be given to the public.

TESTING STEEL AT LOW TEMPERATURE.—The French Government has caused to be made several tests of gun steel at a low temperature, 75° to 100° below Fahr. Part of the bars were hardened and part unhardened. The breaking load was increased by the cooling three per cent, in the instance of the unhardened bars, and six per cent in that of those hardened. But in a shock, such as a gun would be subjected to, the unhardened bars, cooled, broke on an average with 5.9 blows, against 14.6 blows under ordinary conditions. With the hardened bars the difference was less, 12.57 blows being required for the cold bars, against 14.4 at the normal temperature. The bars, both hardened and unhardened, had their elastic limit raised 11 per cent by the cold, and their elongation was diminished by 12 to 14 per cent. The bars recovered their original properties upon attaining the ordinary temperature.

MATERIAL FOR CAR-WHEELS.—In a recently published account of the works of the Northern railroad of France, it is stated that they have an ingenious plan, in the interests of economy, of making wheels for cars by bending up seven pieces of bar iron in such a shape that the center fits inside a hand or false felloe, which, in turn, is hammered into a groove in the tire. Felloe and bar are riveted together, and the bars bent round to the center of the wheel, and their ends then have a mold placed below them; cast iron is then run in, forming the hub, which is afterward bored out, and the cast-steel axle forced in by 55,000 to 66,000 pounds hydraulic pressure. The life of the center of the wheel is said to be practically interminable under the ordinary conditions, and the cheapness is such that they are now adopted almost entirely.

SCIENTIFIC PROGRESS.

Cratina—A Digestive Ferment From the Fig.

In 1880, in a communication to the French Academy of Sciences, M. Bouehut reported that he had found the juice collected from the common fig tree (*Ficus carica*) to contain a powerful ferment capable of digesting aluminoid substances, thus confirming a belief of the ancients that the juice possesses digestive properties. This ferment is now the subject of a paper by Dr. Mnesi, in which he reports its isolation, and describes its properties. Juice collected from the fruit and branches of the fig was filtered to remove the serous portion from the insoluble, the latter repeatedly washed with water, and the washings added to the filtrate. This liquid, which after repeated filtration, was obtained limpid, was distinctly acid in reaction, and when placed in contact with moist fibrin, digested it completely. It was evaporated to a small volume, again filtered, and treated with absolute alcohol, which threw down a plentiful white precipitate that dried, when exposed to the air, to a dark-yellow amorphous mass. This, when treated with water, swelled up and imparted a milky appearance to the liquid, but a clear filtrate from it, though it gave the reactions of vegetable albumen, had no digestive power. The residue, insoluble in water, dissolved readily upon the addition of a trace of acid or alkali, and the solution, placed in contact with moist fibrin, effected complete and true digestion. To the ferment thus isolated Dr. Mnesi gives the name "cratina," from *krade*, the name given by the Greeks to the part of the fig with which they specially associated the digestive property. It contains nitrogen, and in the dry state it forms a friable, semi-transparent, dark-yellow, amorphous mass, yielding an amber-yellow powder. In water it swells, but does not dissolve, though upon being shaken it imparts to the liquid a milky appearance. When dissolved by the aid of alkali or acid a concentrated solution is dark-yellow, but becomes colorless upon being diluted. Cratina differs from pepsin in maintaining its digestive power in an alkaline liquor, and from papain or papayotin in being insoluble in water, not precipitated from solution by alcohol or lead acetate, and in its activity not being diminished in the presence of hydrochloric acid. In a neutral liquid it is devoid of digestive power and it has no reaction upon starch.—*Pharm. Journal*.

Energy.

Before the Thompson Scientific Club at Lynn, Professor Thompson recently delivered a very interesting address on "Energy." Formerly, he said, matter was considered as the thing that existed, and force the something that acted upon it. Energy is a term used to express something which we do not always understand. It exists everywhere so far as we know. Matter was considered indestructible. If we admit that energy can act on energy, we have no need of the old matter and force. We can see the changes in energy, though we cannot discover the thing itself. We have potential and active energy. Potential is simply stored energy, power to do work. The water in the reservoir is the same as the water a hundred feet lower, but it can do work that the other cannot, because it has energy stored in it. When that water is running down the hill and turning the wheel, it shows its actual energy. The earth revolving is another case of stored-up energy, as is also a wheel in motion. A spring is an example of elastic energy. In a boiler we have kinetic energy transformed from the heat of the fire. These are all mechanical forms of energy. The cannon-ball shot into the air shows energy of motion in its ascent. When it reaches the highest point, it has energy of position. When it strikes the ground and bounds, it shows elastic energy. Besides this, there is energy of temperature, which the hot cannon-ball possesses. This is called molecular energy. If we could take all the heat out of anything, it would become liquid and then frozen. This has been done even to air. There is another or electric energy, another chemical and another radiant. Every form of energy is convertible into any other, sometimes at so great waste as to be impracticable for use. In converting mechanical energy into heat, it is almost perfectly efficient, but in converting heat to mechanical motion, 90 per cent is lost. The energy of heat is disorganized as contrasted with the organized, direct energy of motion. A disorganized army, each soldier going his own way, can do little. The tendency in nature is to degrade energy.

THE NATURAL GAS SUPPLY.—The late utterances of Prof. Orton in regard to the durability of the natural gas supply seem to have stirred up quite a feeling against him on the part of those interested in the continuance of the supply. By late accounts we notice that a resolution has been introduced in the Ohio Legislature calling for an investigation of charges made against the professor as State Geologist in reference to the stand he has taken. The resolution recites that in business circles in New York and elsewhere Prof. Orton has stated the gas supply is not only temporary but rapidly declining, and that such statements

have rendered capitalists timid and kept manufacturers from the field. The resolution further charges Mr. Orton with thus intentionally depreciating the value of natural gas territory to better enable the Standard Oil Company, in whose employ it is charged he is, to obtain control of the business.

Scientific Progress.

Intellect is the great factor in commercial success, whether of individuals or nations. Take the case of the skilled brick-layer and the hod-carrier. The first is using brains on his work; the second is using brute force. When he goes up the ladder with his hod of bricks he has also to carry his own weight—thus wastefully expending force. Some one notices this, and substitutes for the brute force of the human that of the horse; then the horse is displaced by the mechanical force of the steam engine, which can do the work of 15 men or of two horses in the same time. Coal converted into heat is doing all the work. The coal mined each year in the United States represents in actual work more than the sum of the force of the total population of the globe, assuming all to be strong men. Thus the substitution of a natural force for human power vastly increases the productive capacity of the human race.

Guided by intellect, taught by science, the natural forces can do in a few hours what the unaided labor of many men could not do in a lifetime. It was not prophecy, but a flash of genius, that drew from Stephenson the assertion that it is the sun that drives the locomotive engine by being liberated from the coal in which it has been stored for ages. But man can neither create forces nor endow anything with properties; all that he can do is to convert and combine them into utilities. The man that does this with knowledge is spared the dismal failures of ignorance, but he that tries to use powers without understanding them is inevitably punished for his rash presumption. It is this presumption that causes the mortality and disease that follow in the wake of civilization. Natural law, like the civil, never admits ignorance as an excuse.

In this century three scientists have revolutionized commerce—Oersted of Copenhagen, and Faraday and Wheatstone of London. It was Faraday that Huxley said, in effect, that any nation would do well to spend \$500,000 in discovering such a man, and an equal amount in educating and setting him to work. Bessemer, studying away at steel, has revolutionized ship-building. Dr. Joule's studies in the mechanical equivalent of heat produced the compound engine, by which the necessary amount of coal for carrying a given cargo has been reduced more than 40 times, that is, a steamship that in 1850 carried a cargo at an expenditure of 14,500 pounds of coal to a ton, now does the same work by burning about 350 pounds. Joule's studies in heat have made it possible for a cube of coal that will pass through a rig the size of a twenty five cent piece to drive one ton of cargo for two miles in one of the most improved steamships. In 1880 the rate of grain from New York to Liverpool was 9½ pence; in 1886 it was 1 penny a bushel. The reduction was primarily due to the scientist.—*Aluminum Age*.

INDIVIDUALIZING.—Never, since the "world began" says a cotemporary, did the individual man do his own thinking, as he is now doing it. This may bring chaos for a time, for man in a new role does not always act wisely. The labor question is being pushed too rapidly, and disaster for a time may be the result. The manufacturers may be compelled to organize for self-protection as in Australia; then the laborer will suffer. The labor leader never required the wisdom that he does now, not only to gain the greatest benefit at the least cost for those he leads, but even for self-preservation. The day of the cheap politician is rapidly passing, and the voters are looking for men and not cheap clap-trap. They are not turning grid-irones so much as they were, and the party leaders will be as helpless as a herrel in a whirlpool before 1892.

THE WEAR OF RAILS.—A recent German paper makes reference to some careful lists lately carried out to determine the wear of steel rails of different degrees of hardness. The chemical and physical characteristics of the rails tested had been accurately determined, and the test for wear consisted in letting 26,120 trains pass over them during a period of 1833 days. The rails were then thoroughly cleaned and weighed, and the difference between the initial weights accepted as giving the loss from wear and rusting. The tests are said to have shown that the wear thus determined was in about an inverse proportion to the tensile strength of the metal, so that it would appear to be advantageous to insist upon high tensile strengths.

IN THE NEW PROCESS OF MAKING WHITE LEAD the ore as it comes from the mine is volatilized and oxidized by the air, the fumes are condensed by a slightly acid liquor, and the resulting sludge is washed and dried for the market without having been touched by the men. Quickness of manufacture, starting with ore and not with the purified metal, and avoidance of danger to the workmen, are among the advantages of the new system.—*Invention*.

GOOD HEALTH.

Microbes and Disease.

Pasteur was among the first to take up and study the subject of the germ origin of disease. His specialty was hydrophobia. He held that a certain kind of disease germ, when numerously developed in a dog, produced hydrophobia, and that such germ might be communicated by the saliva; but, contrary to the later observed action of microbes, the hydrophobia germs lost their power of communicating their particular disorder (rabies) on becoming dry.

Dr. Henry Gihbons, in a recent lecture at the Cooper Medical College in this city, when speaking of the origin of microbes, remarked that all dead animal and vegetable substances tend to decomposition, creating foul odors and gases and developing microbes. Some of the microbes germs and spores caused by putrefaction would survive boiling in water. Certain of these germs are so small that 28,000,000,000 of them are found in a single drop of water. A drop of water will contain more of these little animals than there are inhabitants on the globe. Enough of them would be germinated in a few days to fill the great oceans, if they all survived. Fortunately they die young.

False ideas prevail regarding antiseptics and disinfectants. Many of the popular liquids merely destroy bad smells by worse odors. Boiling water and heated moisture are among the best and cheapest disinfectants. Heat will destroy the germs of scarlet fever and small-pox. Spores when dried are exceedingly hard to kill. Some will survive boiling water. Enforced cleanliness and soap and water are a preventive, but beyond their powerful disinfectants are also necessary.

Modern research seems to show that nearly or quite every disease has its peculiar microbe, the germs of which may lay dormant in the system until some peculiar condition is present under which they may be developed. The same peculiar condition may also render the system susceptible to their entrance from without.

The Relation of Microbes to Nose and Throat Diseases.

At a recent meeting of a British Medical Association, Dr. John MacIntyre, of Glasgow, Scotland, gave an interesting lecture on the relation of bacteriology, to diseases of the nose and throat. In the course of his lecture as reported in the London *Lancet* the doctor discussed the general facts concerning bacteriology, such as classification, vital phenomena, etc., and stated the arguments for and against the vitalistic theory of disease. He demonstrated a large number of specimens of well known forms of micro-organisms under the microscope, as well as numerous micro-photographs on the screen, and made special reference to those of interest in throat and nose work. He showed several found in the mouth and nose of healthy people, which are apparently harmless, and others found in diseases where there is decomposing material such as in cancer. He referred to the specific forms found in diseases of the lower part of the respiratory tract, as tubercle, lupus, diphtheria, pneumonia, and suppurative diseases.

Lastly, he discussed the question how protection was to be got from the diseases associated with micro-organisms, noting the result of inoculation. He explained some interesting experiments recently made in Glasgow with reference to the hypodermic injection of chemically pure carbolic acid, which he thought had far to demonstrate the possibility of rendering the effects of certain micro-organisms inoperative within the body. In considering the possibility of rendering the tissues unsuitable for the growth of organisms after their entrance into the system, he cautioned his audience not to be carried away too hastily by Koch's or Liebreich's methods of treatment for tuberculous.

As a word of caution to accompany the above we give the following paragraph from the pen of a writer in a New York journal who, in commenting upon the report of the *Lancet*, says: "The remedy proposed for ordinary throat and nose diseases may be worthy the consideration of physicians who have cases of la grippe under their charge. It is a fact that the latter disease is very prevalent in a great many of our populous places, and that it seriously affects the nose, throat and respiratory organs, and it is not improbable that the cause may be produced by some form of bacteria which the remedy proposed may relieve. But persons should beware of the use of carbolic acid in the manner suggested, except under the direction of a skillful physician."

CURIOUS ACCIDENTS.—Mrs. Eliza Foster, 59 years, of Philadelphia, recently fractured a rib while trying on a pair of boots at a shoe store. As Mrs. Foster was pulling one of the boots on her foot a crack was heard, and she complained of great pain. She was taken to the hospital. Here, says the Philadelphia *Press*, is the 45th case of the kind known to the medical profession. Another remarkable case is reported of a needle which had found its way into the body of a Springfield, Mo., woman and which after a devils-experience and travel of 35 years, came out through her side the other day. The needle had lost its temper and was as pliable as a piece of wire. Still another, a wonderful case, of a Pennsylvania woman, 79

years old, has recently been reported. The woman who had been bent double with rheumatism for many years, and was two-thirds of the time confined to her bed, is said to have been completely cured by the fright caused by discovering a snake in the chimney. She is now entirely free from pain and is as erect and agile as a woman of 20.

ELECTRICITY.

Electrical Progress.

Practical progress in electrical matters has quite outrun the literature of the art. So eager have been inventors and machinists to advance in this art that they have kept quite ahead of the scientists in their experimental studies. As a consequence, some mistakes have been made. This is also one of the chief reasons why so many accidents have resulted from the introduction of this new agent into the mechanical and other economies of the day. The science of electricity is not studied as thoroughly as it should be. Our institutions of learning, from the common school up, are in the background in this respect. The recent increase of periodical publications are largely helping to bring up this work.

Prof. Silvanus P. Thompson of London, England, has recently given to the world a series of four lectures in book form, which have added much to the needed literature in this direction. In his efforts to supply this great need, the professor has conducted a most thorough search through all the old and new English, French and German publications for records of reliable experiments and data about electro-magnets, and after collecting them and drawing his conclusions, added to them the result of numerous and original experiments of his own and presented them before the Society of Arts, London, in the form of lectures, which constituted one of the sets of Cantor lectures of the session, 1889-90.

With indefatigable labor, Prof. Thompson succeeded, by means of tables and simple formulae, in reducing the calculations concerning electro-magnets to such a practical shape, that the calculation of a magnet, to develop a definite number of lines of force, or to exert a pull of a definite number of pounds, is now a comparatively simple matter to a person possessing fair mathematical ability.

The first lecture contains a historical sketch of electro magnets, in which many of the famous magnets of the early days are described as well as many of the experiments made with them. The typical forms of magnets are briefly described next, and then comes a very clear and interesting discussion of the magnetic properties of iron and the methods of measuring permeability. A shop method of roughly estimating the permeability of iron by means of the "permeameter" devised by Prof. Thompson, is given and seems well suited to that purpose, as many of the objections to other methods are avoided. The lecture closes with a short and clear presentation of the phenomenon called "Hysteresis," and an interesting and instructive list of "fallacies and facts about electro-magnets," many of which will astonish and surprise any one on first reading.

The second lecture is devoted chiefly to the general principles of design and construction. The principle of the magnetic circuit and the deduction of the formulae is discussed in a very lucid way.

The third lecture takes up the question of the winding of magnets. Many common-sense directions and suggestions are given and also a wire gauge and amperage table which will prove of great value to the designer of magnets.

The fourth in the series is devoted to electro-magnetic mechanism, and gives principles and magnetic directions for calculating magnets whose armatures are to have definite motions.

ELECTRICAL CRANES AND HOISTS.—A writer in the London *Iron Monger*, says that some things are done better in the United States than in England, but that in some other things the converse holds good. In some of the applications of electricity that journal says the English are decidedly behind our American cousins, and particularly in respect of its use for cranes and hoists. Incidentally, it may be remarked that Switzerland, France and Germany are also moving faster in these respects than we are in Great Britain. The subject was dealt with briefly in a paper by Mr. W. D. Sandwell, read before the South Staffordshire Institute of Iron and Steel Works Managers on April 11. The paper is short but suggestive, and the subject generally merits much more British attention than it has yet received.

Electrical cranes and hoists are capable of being used with success and economy in situations where other forms of power could scarcely be made use of at all. For building purposes such cranes are especially adapted, and in permanent structures they are very advantageous. In the United States, pig iron, machinery, and so forth are efficiently handled in this manner. Mr. Sandwell is of the opinion that our large docks could be fitted with electric gear much cheaper and far more efficient than the hydraulic power now used. In a large installation of this kind a total efficiency of 60 per cent. could be maintained, as against 40 per cent. from hydraulic power and 30 per cent. from compressed air.

USEFUL INFORMATION.

THE PHILOSOPHY OF ARTIFICIAL ICE MANUFACTURE.—The scientific fact on which the making of artificial ice depends is that when a liquid evaporates it uses up a great deal of heat, which it draws from anything that happens to be around it. If a can of water is at hand, its temperature is reduced, and if the action goes far enough the water will be frozen. This cooling action can be felt by pouring a little ether or alcohol upon the hand. The liquid evaporates rapidly, and the loss of the heat which it takes up cools the hand very perceptibly. If a bottle containing water is kept wet on the outside with the ether, the evaporation will chill the water and eventually freeze it. This is eventually the process by which the *cafés frappés* of French restaurants are produced. The decanters filled with fresh water are set in shallow tanks containing brine, which remains liquid below the temperature at which fresh water freezes. In contact with these tanks are receivers, which can be kept charged with newly formed ether vapor. The chilling vapor cools the brine, and this in turn takes heat from the water in the decanters, which soon freezes.—*Pop. Sci. Monthly.*

SHADING GREEN HOUSES.—There is some difficulty in choosing a shading for green-houses, as some materials wash off too quickly and others not readily enough, as in the case of the common lime-wash. A correspondent in the *Gardener's Monthly* says he has tried many materials, but all have proved unsatisfactory. He found the following, however, very useful for many other purposes besides shading: Take one pound common whiting, one ounce of the best glue, and a quarter of an ounce of bichromate of potash, called also red alum. Soak the glue the day before using, melting in a common glue-pot, and then dissolve the bichromate in warm water. Mix the materials together and thin them down to the consistency required. These, after being exposed to the light, are almost as adherent as oil paint. Of course, by reducing the proportion of bichromate, the material can be made less retentive, but a coat of this wash on the greenhouse will last the whole summer, and even he troublesome to wash off, not to such a degree, however, as lime-wash. It should be constantly stirred up while being used.

ALLIGATOR AND CROCODILE.—It is said that only five crocodiles have ever been captured in Florida, although alligators are numerous. One difference between the two is that the crocodile works his upper jaw, while the alligator snaps a man in two with his lower jaw.—*Ex.* The alligator and crocodile are both of the same family, which includes three genera, the *Gavialis*, *Crocodilus* and *Alligator*. The type of the first is the "gavial" of India, the second the "crocodile" of Egypt and the third the "alligator" of America. The last named is peculiar to this continent. It was first discovered by the early Spanish voyagers, and thought to be identical with the crocodile of the old world; but scientists have since found distinctions to exist which indicate generic differences. It may become an interesting question among scientists, if the crocodile of Egypt has been found in Florida—how did it get there? Is it a variation in nature, or has that particular specimen of the San Juan family been recently transported from its native waters to those of Florida?

ASBESTOS FOR THEATER CURTAINS.—The building laws of most of our large cities now compel the use in all new theaters of fireproof drop curtains. The great weight of iron curtains has led the managers of many of the best theaters to adopt asbestos as the best fireproof material for the purpose. An asbestos curtain is light in weight and can be lowered or raised in a few seconds of time with little effort. It does not require a heavy rigging to hold in place. It is flexible and will fold or roll into small compass if necessary. In appearance it resembles cotton duck, and it can be painted or decorated. In use it completely protects the audience from any fire which might originate on the stage.

THE PROCTOR TOWER.—The proposed Proctor steel tower at the World's Columbian Exposition, says the *Engineering News*, is to be 1155 feet in height, and will resemble the Eiffel tower in its general appearance. It will be hexagonal in plan, instead of square, however, and will have a larger base and start at a smaller angle with the vertical than the Eiffel tower. The estimated cost of the tower is \$3,000,000. There is but little probability that it will materialize.

THE LAQUER used in chandelier work is made of shellac dissolved with 95 per cent of alcohol, very thin, slightly colored with dragon's blood. It should stand a few days for the insoluble portion of the gum to settle before being used. The clear laquer should then be poured off and filtered.

The first horse-car made its appearance in New York City in 1832. It was made by John Stephenson in the preceding year, with seats running lengthwise and had also seats on top.

TO CUT GLASS VESSELS neatly, fill the vessel the exact height you wish it to be cut with oil of any kind; then dip, very carefully, a red-hot

iron in the oil. This will heat it all along the surface, and when the upper portion cracks all round, you can lift it clear off by the surface of the oil.

MONKEYS IN FLORIDA.—A colony of 200 or 300 monkeys is reported to exist in the everglades of Florida. They are supposed to owe their origin to the wreck of a vessel upon the coast having on board monkeys, which escaped into the forest.

SHOP NOTES.

BELTS.—When first put on, belts are always made tighter than they need to be for the work required, in order to allow for the stretching which is sure to follow. They are then run until they become too loose for efficient service and the process of overstraining and stretching is repeated. When vertical, this stretching of the belt acts directly to loosen it, and the necessity for tightening occurs more frequently than it does on horizontal belts, where the weight between pulleys maintains more or less tension in the slack side. For this reason a long horizontal belt can hardly be made to slip, without working it to destruction, while the driving power of a vertical belt depends directly upon its initial tension, and this must be carefully looked after to obtain the best results. The position in which a belt may run does not affect the size required for any given duty, but it does affect very seriously the amount of care and attention required to keep it in efficient service.

SHARPENING EDGE TOOLS.—A German scientific journal says: "It has long been known that the simplest method of sharpening a razor is to put it for half an hour in water to which has been added one-twentieth of its weight of muriatic or sulphuric acid, then lightly wipe it off, and after a few hours set it on a hone. The acid here supplies the place of a whetstone by corroding the whole surface evenly, so that nothing further than a smooth polish is necessary. The process never injures good blades, while badly hardened ones are generally improved by it, although the cause of improvement remains unexplained. At length this process has been applied to many other cutting implements. The workmen, at the beginning of his noon spell, or when he leaves it in the evening, moistens the blades of his tools with water acidulated as above, the cost of which is almost nothing. This saves the consumption of time and labor in whetting."

GEAR TEETH.—It has been said that gear teeth should be designed strong enough to carry the whole load on one side of the tooth, but there are places where the teeth are obliged to take care of the load at a greater disadvantage than this. In out gears the teeth fit in together very closely and a short driving shaft has not far to get out of line before the teeth will bind cornerways and come snapping off. It may do for pulleys and belts to operate in this fashion, as that appears to be one of the great points in their favor, but with closely fitted gearing the trouble lies in the alignment of the shaft and gear stands when the teeth are breaking out.

SPIRAL SPRINGS.—The proper way to use a spiral spring is under a state of compression, provided that the first coil of the spring can be taken care of properly, but when this is done there comes in another element that disturbs the proper working of the spring. The coil does not keep in perfect alignment while being compressed to its full extent, but sets off corner ways a trifle, and gives a hind such as no ball and socket joint has been able to relieve. The proper way out of this difficulty is to adjust the spring to set in line while under about a two-thirds load, and let it take care of itself in all other positions.

LATHE TOOLS are made right and left-handed, and like everything else in this line seem to come just wrong, or at least one hand tool will be getting into the place of the other. Lathe tools only appear right in this respect when they are viewed from the back side of the lathe; then a right-hand side tool will be seen standing over to the right and cutting toward the face plate, and the left-hand the other way, the reason no doubt depending on the tools for cutting right and left-hand screw threads in the lathe.

WOOD WORKERS are very fond of having everything set enough to touch up easily with a file. It is a great saving in time to stop a planer, or molding machine, and put on an edge by hand power rather than disturb the set of the machine. The wood turner plays the same trick when he holds the edge of his tools hard against the work to turn them line, that he may bring up an edge with the file, as there is nothing else that will get around the spurs of a parting tool.

THERE is a natural law relating to belting which is not generally known, but which is nevertheless of value in practice. The hug or adhesion of a belt is as the square of the number of degrees which it covers on the pulley. For example, a belt that covers two-thirds of the circumference of a pulley requires four times the power to make it slip as it does when it covers only one-third of the same pulley.



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SAN FRANCISCO:

Saturday, May 16, 1891.

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Passing Events.

River mining by dredges, which has been successful in Australia and unsuccessful in this country, is about to be tried on the gravel bars of the Jefferson and Madison rivers in Montana. Very large and powerful dredges are being built by a company principally composed of Denver capitalists. New machinery is also being put on the dredge on the Carson river, Nev., the machinery formerly in use being faulty. The bed of the Carson will soon be prospected by this dredge.

Mining work is to be renewed this summer at Big Bend, Butte Co., and the river is to be turned into the great tunnel in July. They expect three months' work in the river bed. This enterprise was abandoned two years ago, and the electric-power plant removed. Steam power is to be used this time for the derricks and pumps, and two places in the river bed are to be thoroughly tested.

There are a good many prospectors in Alaska looking for placers and quartz. That Territory offers a wide field, and some very rich gravel has been found. The climatic conditions are not such as to permit work along the Yukon river in winter, so that the men have to be satisfied with a short season. Well-equipped quartz mines, however, can be worked the year through.

CLEMENT F. WOOD, a Comstock pioneer, and who was at one time Superintendent of the Del Monte mine, died in this city this week.

COMSTOCK mines produced 4095 tons of ore last week yielding \$117,432.

The New Mining District in Utah.

A great deal has been said and written lately of the new discoveries being made in the mining region of Deep Creek, Utah. Lying in Tooele county, west by south of Salt Lake, some 130 miles from the latter place, and reaching well into White Pine Co., Eastern Nevada, it bids fair to become of very great importance. From such information as we have at hand, we are led to believe in the practical existence of a district fully 20x30 miles in extent, with high and low grade smelting ores in abundance, although in a region almost devoid of wood and water.

We have been watching the progress and development of Deep Creek with considerable interest for some weeks, but have refrained from making any prominent mention, any more than can be found in our general "Mining Summary," for fear of the very depressing and disastrous effects produced by mining booms that fail.

From the Salt Lake Tribune, the Salt Lake Stock Exchange, whose officers have lately communicated with us on the subject, we are forced to believe in the existence of a new mining district, at Deep Creek, of great extent and richness.

The formation carrying the ore deposits in Eastern Nevada is mostly granitic, while that of the main portion lying in Tooele county, Utah, lies in porphyry with a limestone contact; the ore carrying sulphides, chlorides, and horn silver quite freely, with a small showing of gold, while others range from 5 to 40 per cent in lead, with from 10 up to many hundreds of ounces in silver. It seems only necessary to mention one claim, among the many, that are already becoming celebrated for their richness in this district, to get some idea of the extent and value of the new discoveries.

The Buokhorn located in about the center of the district, as at present developed, has a width of from 12 to 14 feet, and is traceable for nearly 1000 feet, all carrying pay ore. The dip is almost perpendicular, with footwall of porphyry, and hanging-wall of limestone. The assays show for first-class ore 602 ounces in silver with 9 ounces in gold, and for second-class 136 ounces silver and 2 ounces of gold, all averaging about 10 per cent in lead.

Some of the ores from this mine have yielded as high as 800 to 1800 ounces in silver with 10 to 12 ounces in gold; a showing that is apt to make mining men feverish, and lead many into unnecessary expense and privation.

The country lying between Salt Lake and the new district, so far, has not been a very pleasant one to travel over, there being a scarcity of wood and water, with several barren desert wastes to cross before reaching the mines.

Stage lines from Salt Lake are already projected, with one now in operation, and even a railway is seriously talked of. With transportation facilities completed, and the ready adaptation of the American miner to new fields of enterprise, the district promises to soon be prominent in the mining world. Pipe lines are already projected to carry water from springs and streams adjacent to the mines, while artesian wells are quite possible and practicable in the future.

There are already several sub-districts at Deep Creek, with nearly 300 claims recorded. Salt Lake City is the initial point at present, from which nearly all prospecting parties outfit and make their start for the new mines. That City, Utah and Eastern Nevada, are to be congratulated on the new find, which, if our information be true, will revolutionize all that part of our country and shower benefits over the whole land.

STANFORD UNIVERSITY.—It is now tolerably certain that the first school year of the Leland Stanford Jr. University will begin October 1st. It will be divided into two half-year terms, ending respectively in February and on Commencement Day, June 15th, with the usual Christmas and Easter holidays. While the tuition in the main will be free, board in Madrono Hall will be \$3 a week and rooms will be \$1.50 a week, including attendance. The faculty thinks the actual living expenses of the students may be limited to \$200 a year. Students who apply for admission to the freshman class must be at least sixteen years of age. Men of mature years who desire to make special studies will be required to pass an examination except in English.

Economy in Burning Fuel.

It is stated that nature has furnished us with fuel in three forms, solid, liquid and gaseous; solid the most common; liquid containing the greatest energy; gaseous the most convenient for use; and that the average yearly production of petroleum for the last ten years in the United States was, say 24,165,920 barrels, equal to 3,310,400 tons, against 150,000,000 tons of coal mined in 1889. Now as the energy of oil is practically 50 per cent more than that of coal, if all the oil taken from the ground last year had been used for fuel, it would have displaced on this basis, 4,965,600 tons coal only; but assuming that oil could deliver in practice double the energy of coal, it could then displace only 6,620,800 tons, and we would still require 143,379,200 tons for heat.

So that oil cannot play an important part in supplying our heat requirements. The natural gas used in 1889, it is estimated, contained energy equivalent to from 12,000,000 to 15,000,000 tons of coal, or more than twice the energy of the oil production of the country for the same time.

Now while it is generally admitted by scientists that California holds within her borders vast deposits of petroleum; we are still large consumers of coal; and any process of fuel burning that will lessen that consumption 10 to 30 per cent, would confer an almost incalculable benefit upon our State.

The ordinance passed by the municipality of the city of Chicago, prohibiting any but "smoke burning" contrivances under boilers for making steam, has been attended with beneficial results; clearing up the smoke and soot laden atmosphere of that city, and accomplished with an absolute saving in the consumption of fuel; all being claimed to result from the experiments and practice of the Chicago Heat Storage Company.

This company is now making plans and conducting experiments with a view to the general adoption of their methods in the city of San Francisco and other parts of the Pacific Coast. Their process and patents, as far as understood, comprise the turning the fuel into gaseous matter before it is ignited or consumed under the boiler; this being accomplished by the use of a "producer," or retort, where the wood or coal is ignited, turned into gaseous matter, assisted by the use of a jet of steam flowing into the bottom of the producer.

The oxides, carbons and other combustible material, now in a rarefied form, are forced under the boiler by the steam and the natural draft from the smoke-stack, when ignition takes place. In addition, a system of brick checker work is used under the boiler to confine, partially retain, and to force the flame and heat up against the boilers. It is claimed that in addition to the cleanliness and certainty of combustion, that from 20 to 40 per cent can be saved over and above the fuel consumption, as practical in California at present.

The process looks plausible and will possibly effect all that is claimed for it, yet a practical demonstration will be necessary to prove its value.

Fuel-saving "processes" do not always save fuel. A few years since some tests were made here of the fuel-burning process of a certain Fuel Economizing Co., which had obtained a very favorable contract with the Southern Pacific R. R. Co. for the sale of their method, provided it was a success. After some preliminary trials at the works of the Market Street Cable Railway, the steamer Piedmont, plying between San Francisco and Oakland, was selected on which to make the test, the design being to give the Fuel Co. a six-day's trial and the same to the Railway Company.

The process of the Fuel Co. consisted in the mixing of a decoction of holling hot water with certain proportions of ammonia, salt and rosin, and which was then sprinkled over the coal, using about 60 pounds per ton.

The Topeka people were given the coalyards and sheds at Oakland, to prepare and handle the coal, without restraint or hindrance. The boat at that time was consuming 84 tons of coal every 48 hours, the fuel being delivered in tank-cars, containing 1000 pounds of coal each. Apparently the fuel company was making quite a success, as they gained some three or four tons of coal, above the boat's usual consumption, in the first 48 hours.

This, however, was easily accounted for, as

it was found that the tanks were being rammed and packed. The coal tanks, that were usually received and averaged by the boat engineers at 1000 pounds each, were found to weigh 1150 to 1250 pounds coal each. This part of the process was soon stopped, and the tanks averaged and weighed thereafter, throughout both trials. The tests were made, as nearly as possible, identical as regards time, pressure of steam, revolutions, consumption of water, etc.; with the result that the boat came out ahead of the process, in her six days' trial, about 4000 pounds.

As the master mechanic of the railroad company stated, it took the extra fuel consumed by the Fuel Co., over and above that of the boat, to burn off the water they had put on the coal?

The trials of the Chicago company (which is quite a different concern) will be noted with some interest here, as our coal fields are not very extensive on the Pacific, fuel being high priced, and any tangible saving in its consumption would meet with ready appreciation. A trial has already been made of a part of the Chicago process, at the works of the California Powder Co., but without very appreciable results. The Powder Co., is consuming Santa Paula petroleum, and getting the very high evaporation of 13.85 lbs water to 1 lb of petroleum, a result probably not surpassed in the United States, and which was but faintly added to in the experiment of placing brick checker work or combustion chambers under their boilers.

California Mines.

In another column is a communication from Almarin B. Paul, the well-known California miner and millman, giving the result of some recent observations in Colorado and Utah. Mr. Paul, like others who go from here to Denver, is impressed with the life and enterprise of that place, and the chances that miners have to obtain capital for mining enterprises. Time was when San Francisco was the center for such enterprises; but in these days, men go elsewhere to obtain capital for mining development. It is unfortunate that this is so, since the best properties are fast going into the hands of capitalists from other places. When men come here now to enlist the attention of capital, they have great difficulty in even obtaining a hearing, and the encouragement is so small that a second visit is seldom made.

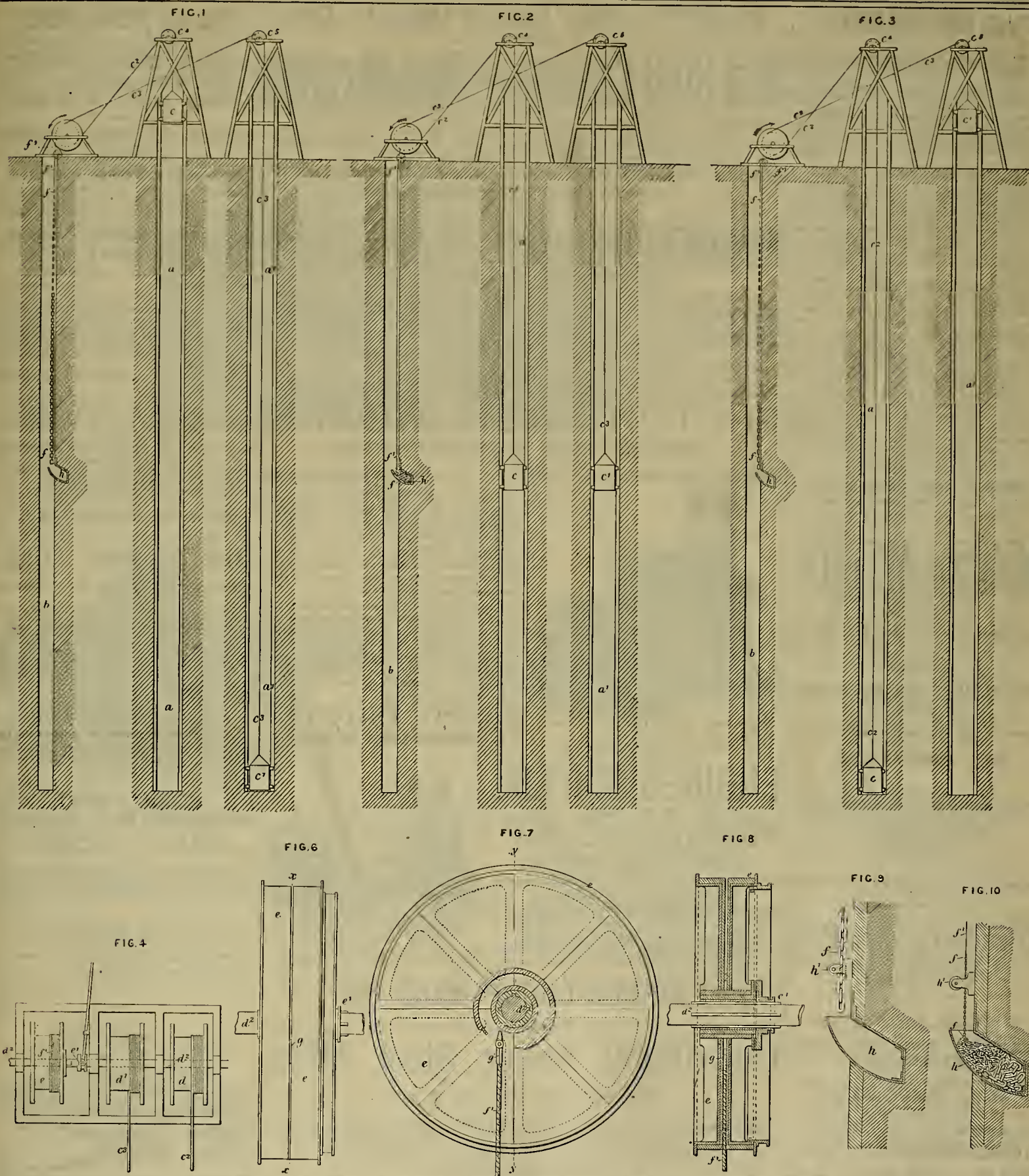
This being the case, and the dependence of the mining community for capital being in relation to "outsiders," Mr. Paul's suggestions in relation to the coming World's Fair are strongly to the point. We must advertise our mines outside our own borders, and there will never be a better opportunity than the fair will offer.

Thus far the main subject in connection with the World's Fair, as far as California is concerned, has been the appointment of a horticultural man, and the settlement of this question seems to have put everything else in the background. The matter of display of fruits and wines is being worked up, but nothing is said about the mining interests. No representative of that industry has been chosen on the Commission from this State; nobody has been selected to look after a special mining display.

As Mr. Paul remarks, California can make a better mining display than any State in the Union if she chooses, since the variety of her mineral products is greater; but there is no time to lose. If anything worth the while to do is to be done, a commencement should be made at once and the mining community should demand that a decent share of the appropriation should be set aside for the mining industry. Capital is wanted here in mining as well as to buy up the lands which are for sale for agricultural purposes.

LEAD ORES.—The Collector of Customs at Eagle Pass, Texas, has been instructed by the Treasury Department to treat as lead ores all alleged silver ores composed of a mixture of ores or concentrates from different mines, pending a review by the District Court of Texas of the decision of the Board of General Appraisers sustaining the protest of an importer against the Collector's assessment of duty on certain alleged silver ore.

THERE are 1600 people living in Bisbee, Arizona, and there are 900 men at work in the mines.



BALANCE FOR EQUALIZING STRAINS ON WINDING GEARS IN MINING SHAFTS.

Lansell's Mining Balance.

The "Bendigo balance," the invention of Mr. George Lansell of Landhurst, has been introduced into many of the mines of Victoria, Australia. The apparatus is for the purpose of equalizing the strain on winding gears such as are used in mining shafts and warehouse lifts. The invention consists mainly in coupling the auxiliary winding drum or spider to the shaft of the main winding gears, and in attaching to this auxiliary drum or spider a rope or chain of increasing weight to act as a counterpoise to the cage and hoisting rope. This rope or chain hangs down either the pump shaft or down a blind shaft or bore-hole adjacent to the winding gears.

If motion continues, the parts assume positions as in Fig. 3, cage *c* being lowered and cage *c'* being raised, the counter-chain being

drawn up from its receptacle *H*, acting then as a counterbalance to the hoisting rope *c'* of the cage *c*.

The application of this invention to a warehouse lift is shown by reference to Fig. 5, wherein the rope *f'* of the counterbalance chain *f* is simply wound in the reverse direction on a drum or main shaft of winding gear in a manner so that its whole weight will act as a counterbalance to rope and cage.

The drawings in detail given herewith almost explain themselves, and to which we refer the reader in a general way, as a lengthy, detailed description would but add complications to a very simple and useful invention.

In the accompanying drawings, Figs. 1, 2, and 3 are sectional diagrams illustrating the invention; *a* and *a'* representing the shafts of a mine, and *b*, the pump shaft, *c* and *c'* being the cages, *c''* and *c'''*, the hoisting ropes, wind-

ing over the guide. Pulleys *c''* and *c'''* leading to the main hoisting drums *d* and *d'*, shown in Fig. 4. In pump shaft *b* he denotes the receptacle for the counterbalance chain *f*, its upper end being attached to a small rope, *f'*, which leads it to the auxiliary counterbalance pulley *e*, as shown in Fig. 4; *d''* is the drum shaft, so arranged that it can be coupled to winding gear by a clutch as *e'*; *g* shown in Fig. 6 is a pivoted clip securing the leading counterbalance rope to auxiliary drum *e*, and so arranged as to admit the rope or chain being wound in reverse directions.

Fig. 4 is a plan of the winding gear, showing the improvements applied thereto. We omit Fig. 5 of the original drawing, as it only illustrates the application to a warehouse lift. Fig. 6 represents a front elevation of auxiliary drum or spider. Fig. 7 is a vertical section on line *yy*, Fig. 6. Fig. 8 is a vertical section

on line *yy*, Fig. 7. Fig. 9 is a vertical section of receptacle for counterpoise chain, and Fig. 10 is a similar view to Fig. 9, but showing the chain in the receptacle.

Assuming the parts to be in position shown in Fig. 1, motion is transmitted to the winding gear in the direction by the arrow, thus raising the cage *c'*, and at the same time lowering the cage *c*, and counterbalance chain *f*, until the various parts assume the position as in Fig. 2.

A BIG JUDGMENT.—The suit of Charles Peyser against the Oro Flat Consolidated Mining Co. for \$34,246.30 principal and \$175.76 interest on a promissory note executed January 2, 1890, has been decided by Judge Wallace in favor of the plaintiff.

F. L. RANSOM has been appointed student assistant in the department of mineralogy and geology at the University of California.

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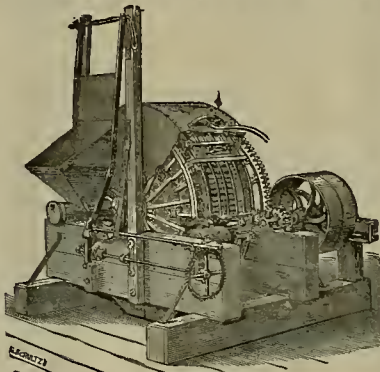
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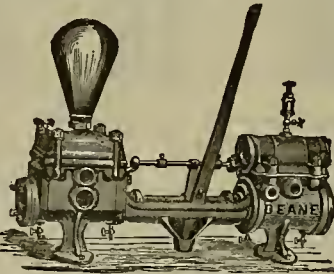
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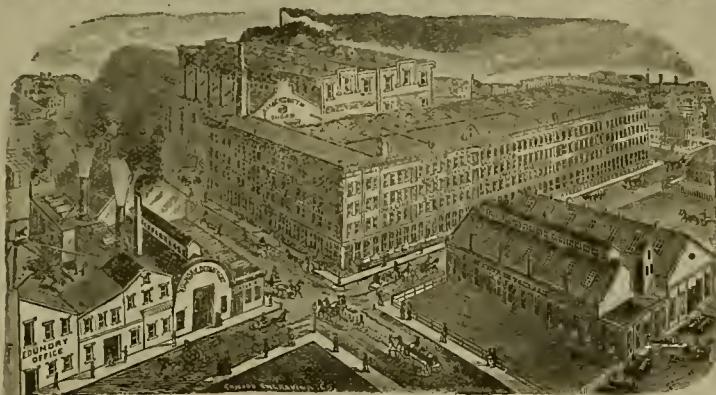
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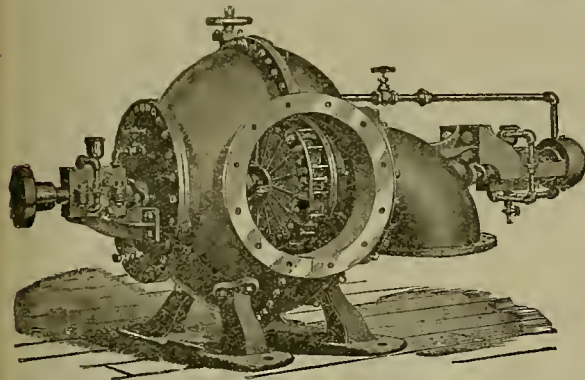
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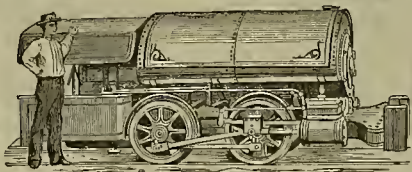
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, May 14, 1891.

Cool moist weather the past week is accepted as favorable to growing crops. Among the better informed it is believed that the output of wheat will be all of 1,800,000 tons in this State; this means with good prices an unusually prosperous fiscal year in this State. The local money is fairly easy. General trade for the season is good.

QUICKSILVER—Receipts the past week aggregate 134 flasks. The market is fairly steady at current quotations.

MEXICAN DOLLARS—The market is quiet at 78 to 78½ cts. Holders do not appear disposed to press sales.

SILVER—Purchases by the Department are reported as follows in this month:

Date.	Offered ounces.	Purchased ounces.	Price paid per ounce.
May 1.....	789,000	350,000	\$.9700 to \$.9840
May 4.....	.....	346,000	\$.9850 to \$.9870
May 11.....	.....	593,000	\$.98125 to \$.9825
May 18.....	.....	144,000	\$.97950 to \$.9890

The market continues unstable both at home and abroad. The feverish condition of European money centers is undoubtedly against silver, but with the return of confidence, its market value will be largely advanced by reason of its gradual absorption and light available supplies. The fact that this country is called on for large supplies of gold is taken advantage of by silver dealers to beat down the price of the latter, but after harvest or say on and after July next gold will set back to this country, for Europe will be a buyer of our railroad and other securities and also our surplus cereals. The balance of trade, then, will be largely in our favor, and to meet it gold will have to be sent to this country. English statistics show that India has drawn silver very heavily so far in this year, larger, if anything, than for four years past.

BORAX—Receipts the past week aggregate 693 cts. This will be shipped chiefly to the East by water owing to freights being lower by that route than by land.

LIME—Receipts the past week aggregate 3183 bbls. The market is steady. Considerable lime is sent up north direct.

LEAD—The market continues unsettled, with quotations nominally unchanged, although it is known that a lower figure than we give for pig is accepted by sellers.

TIN—The market is fairly steady. Month after next the increased duty on tin-plate will take effect, but that on pig tin will not go into effect for two years. As tinplate is only about two per cent tin and the balance either iron or steel, the higher duty will not affect pig tin to any extent, if it does at all. London cables to *Iron Age* report that for pig the market is strong, chiefly on brisk demands for near future deliveries. Spot stocks are in strong bands and consumption continues on a large scale.

IRON—The market continues easy under large stocks on spot and to arrive. The Eastern and European markets have an advancing tendency.

COPPER—The market is essentially unchanged. The impression prevails that a quiet movement is going on to concentrate supplies for a bull campaign. Eastern advices report buyers conservative. Lake Superior ingot is quotable at 13½ to 13½ cts. and 12½ cts. for Arizona ingot; over 11½ cts. for ordinary casting copper is realized only on small parcels.

COAL—Imports the past week aggregate as follows: Nantam, 6516 tons; Departure Bay, 9065; Newcastle, N. S. W., 6553; Tacoma, 10,800; Seattle, 6663; Nagasaki, 2065; Coos, 1200; total, 42,962 tons. A cargo of English spot was on the market as low as \$7 a ton. The heavy shipments of English and free supplies arrived keep the market for steam in buyers favor. After a few days suspension, vessels are being dispatched from Australia for this port. It is said that more vessels are offering there for July-August loading for this port. With us the spot and near-by coal market is fairly easy.

Coal and Coke.

SPOT FROM YARD—PER TON.	TO LOAD—PER TON.
Wellington.....	\$10 00 Australian.....
Greta.....	8 50 Liverpool Stm.....
Carillon Hill.....	8 00 Scotch Splint.....
Nantam.....	10 00 Cardiff.....
Gilman.....	7 50 Leigh Lump.....
Seattle.....	7 50 Cumberland bk 10 00
Coos Bay.....	7 00 Egg, hard.....
Cannel.....	9 50 West Hartley.....
Egg, hard.....	14 00
Cumberland, in sacks 14 00	
do, bulk.....	13 00
Walsend.....	9 00
Scotch Splint.....	9 00
Rymbo.....	9 00 To load.....
West Hartley.....	9 00 Spot, in bulk.....

Coke—English.

Eastern Metal Markets.

By Telegraph.

NEW YORK, May 14.—The following are the closing prices the past week:

Silver in London.	Silver in New York.	Copper.	Lead.	Tin.
Thursday.....	44½	98½	13 75	4 20
Friday.....	44½	98	13 75	4 25
Saturday.....	44½	97½	13 75	4 25
Sunday.....	44½	97½	13 75	4 25
Monday.....	44½	97½	13 75	4 25
Tuesday.....	44½	97½	13 75	4 22½
Wednesday.....	44½	97½	13 75	4 22½

Tin is stronger and in good demand. Lead is steady. It is claimed that copper has a more promising outlook, but at present it is dull. Borax continues to move off free. Iron is strengthening both at home and abroad.

DIVIDEND No. 3 of five cents per share, aggregating \$1500, has been declared by the W. Y. O. D. Mining Co. A cleanup from one month's run of ore from the mine at Grass Valley last Saturday yielded \$5000, not including sulphurets, which go about \$300 per ton. About four tons of ore per day were worked.

Mining Bureau Museum.

Following are among the recent contributions to the museum of the California State Mining Bureau:

From Mr. J. W. Copeland, Specimen of Stromeyerite (sulphide of copper and silver), of Silver King Mine Pinal Co., Arizona.

Medal struck at the U. S. Mint, from bullion produced from Nevada ores, at the Centennial Exposition in Philadelphia 1876, Thos. G. Taylor.

Calcite (Botryoidal), found with Precite at Lone Ranch Chetco, Curry Co., Oregon; and improved folding miners' candlestick, Wernitz patent, Dec. 25, 1888, E. B. Benedek.

Aragonite, Silver Canyon Santa Catalina Island, Los Angeles Co.

Stam, tantalite from Grusen, S. Dakota. Autunite, Black Hills, Werner Saugbutt. Pectolite, Santa Barbara, Dr. S. G. Yates.

Turquoise, Candelaria, Nev., W. H. Shockley. Chromic iron, near Cholame, San Luis Obispo Co., Hutchins & Montgomery.

Copper ore, Whale Mine, Inyo Co., W. C. Chapin.

Fossil shells, Ventura Co. Heike Kani (Face crab), Inland Sea, Japan, Arthur E. Roberts.

Sponge (fine texture), coast of Siberia, Capt. Geo. Ball.

Zinc ore (sphalerite), Silver Canyon, Santa Catalina Island, Los Angeles Co.

Purilite, from Asbestos mines, Thetford, Quebec, Canada, B. E. Syster.

Clay, plastic and refractory, Santa Barbara, I. L. Perry.

Gold quartz, from a ledge in the desert, 35 miles northwest from Mojave, Kern Co., E. P. Marsellus. Severite (hydrous silicate of alumina), Otay ranch, San Diego Co., San Diego Chamber of Commerce.

Gold quartz (rich in fine gold), Florence mine, Leadville, Col., Hans Vogl.

Silver (native, on ore), Continental Chief mine, Leadville, Col.

Gold quartz (showing free gold), Eureka vein, Pine Valley district, San Diego Co.

Tin ingot, smelted from ore of the Temescal mines, San Bernardino Co., J. H. Crossman.

Boulangerite (sulph-antimonide of lead), W. H. Shockley.

Glanconpane (first occurrence noted in California), from Wellets, Mendocino Co., H. F. Finell.

San Francisco Metal Market.

WHOLESALE.		THURSDAY, May 14, 1891.	
ANTIMONY.....	8 00	18 00	
BORAX—Refined, in carload lots.....	8 00	—	
Powdered.....	8 00	—	
Concentrated.....	7½	—	
All grades jobbing at an advance.			
COPPER.....	23 00	—	
Boil.....	23 00	—	
Sheathing.....	23 00	—	
Ingot, jobbing.....	18 00	—	
do, wholesale.....	17 00	—	
Pick and Hammer.....	23 00	—	
LEAD—Pig.....	23 00	—	
Bar.....	23 00	—	
Sheet.....	23 00	—	
Flask.....	23 00	—	
Shot.....	23 00	—	
Fire Box Sheds.....	23 00	—	
Brick, by bag.....	23 00	—	
Chilled, do.....	23 00	—	
QUICKSILVER—By the flask.....	43 00	45 00	
Flask.....	43 00	45 00	
CHROMIUM IRON ORE.....	10 00	—	
STEEL—English, B.....	16 00	—	
Canton tool.....	9 00	—	
Black Diamond tool.....	9 00	—	
Langdon.....	23 00	—	
Machinery.....	4 00	—	
Toe Calk.....	41 00	—	
TINPLATE—B. V., steel grade, 14x20, to arrive.....	6 50	—	
B. V., steel grade, 14x20, spot.....	6 50	—	
Charcoal, 14x20.....	8 00	—	
do roofing, 14x20.....	8 00	—	
do, do, 20x28.....	13 00	—	
Pig tin, spot, by lb, irregular, nominal.....	21 00	—	
IRON—Bar, base.....	3 00	—	
Norway, base.....	4 00	—	
Spot.....	—	—	
IRON—Olingarnock ton.....	30 00	—	
Eghinton ton.....	29 00	—	
American Soft, No. 1, ton.....	23 00	—	
Oregon ton.....	23 00	—	
Puget Sound.....	30 00	—	
Clay Lane White.....	26 00	—	
Shotta, No. 1.....	30 00	—	
Langdon.....	23 00	—	
Thornhill.....	20 00	—	
Gartsherrrie.....	30 00	—	
Barrow.....	30 00	—	
Cargollet.....	27 00	—	

JAMES E. KEELER has resigned his position as astronomer at the Lick Observatory and will occupy a chair in the University of Pennsylvania. The Board of Regents has passed resolutions expressing appreciation of his past services and wishing him future success. W. W. Campbell, instructor in astronomy at the University of Michigan, has been appointed as successor to Prof. Keeler for one year at an annual salary of \$1800. The Lick Observatory had no more active or intelligent young man on its staff than James E. Keeler, and his resignation is to be regretted by all interested in astronomy in this State. His work was always thorough in every way, and he had the respect and friendship of his associates. He was one of the Secretaries of the Astronomical Society of the Pacific and a frequent contributor to its transactions. The Lick Observatory can ill afford to lose such a valuable and thoroughly qualified worker.

STEAM ENGINEERS—An association of the American Steam Engineers, subject to the Supreme Council of the Order, was organized in this city this week with the following officers: Chief engineer, John Oswald; recording engineer, P. L. Stevens; financial engineer, J. M. Zinkle; treasurer, A. Wilson; chaplain, John Farquhar; senior master mechanic, N. B. Ganid; junior master mechanic, C. R. McPherson; inside sentinel, B. J. McShain; outside sentinel, Sidney Ferd.

WHAT CAUSES THE FLAME OF THE ELECTRIC ARC?—The electric arc is composed of a steam of vapor arising from the actual boiling or vaporization of the solid or fused ends of the separated conductors.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.

COMPANY AND LOCATION.	NO.	AMT. LEVIED.	DELINQ'T AND SALE.	SECRETARY.	PLACE OF BUSINESS.
Andes M Co., Nevada.....	37.....	80c.....	Apr 4, May 8, May 28.....	J W Twigg.....	309 Montgomery St
Caledonia S M Co., Nevada.....	44.....	50c.....	Apr 2, June 4, July 5.....	A S Groth.....	414 California St
California Iron & Steel Co., California.....	5.....	35c.....	Apr 27, June 6, June 27.....	F Bonnacina.....	438 California St
Carmelo Land & Coal Co., California.....	3.....	50c.....	April 11, May 16, June 16.....	W T Baggett.....	324 Pine St
Chollar M Co., Nevada.....	29.....	50c.....	Apr 5, May 13, June 2.....	C E Elliott.....	309 Montgomery St
Con Imperial M Co., Nevada.....	51.....	50c.....	May 6, June 11, July 1.....	C L McCoy.....	331 Pine St
Cous Nevada M Co., Nevada.....	5.....	15c.....	Apr 3, May 3, May 29.....	C E Elliott.....	309 Montgomery St
East Sierra Nevada M Co., Nevada.....	39.....	50c.....	Apr 14, May 22, June 15.....	G R Spence.....	309 Montgomery St
Gray Eagle M Co., California.....	23.....	3c.....	Apr 3, May 18, June 9.....	A W Barrows.....	303 California St
Idolow M Co., California.....	2.....	10c.....	May 1, June 1, June 20.....	E F Stone.....	306 Pine St
Indio Creek L & M Co., California.....	2.....	50c.....	Apr 7, May 11, June 1.....	S G Mills.....	413 California St
Lytle M Co., California.....	12.....	10c.....	Mar 30, May 12, May 29.....	W L Luce.....	132 California St
Kentuck Cons M Co., Nevada.....	1.....	20c.....	Mar 31, May 5, May 26.....	J W Pew.....	310 Pine St
Live Oak Drift Gravel M Co., Cal.....	13.....	25c.....	Apr 16, June 2, June 22.....	Jos Morizo.....	328 Montgomery St
Midas M Co., California.....	2.....	10c.....	Apr 27, June 5, June 29.....	A Halsey.....	328 Montgomery St
Mineral King M Co., Arizona.....	5.....	10c.....	Mar 23, Apr 23, May 15.....	T F Norman.....	419 California St
N Bloomfield Gravel M Co., California.....	47.....	25c.....	Mar 26, May 4, May 27.....	H Pichor.....	329 Sansome St
Oak Cons M Co., California.....	8.....	4c.....	Apr 5, May 13, June 10.....	E J Hyatt.....	230 Montgomery St
Peel Cons M Co., Arizona.....	16.....	10c.....	Apr 24, May 28, June 18.....	A Waterman.....	309 Montgomery St
Silver Hill M Co., Nevada.....	28.....	25c.....	Apr 23, May 28, June 18.....	D O Bates.....	309 Montgomery St
Scorpion S M Co., Nevada.....	28.....	15c.....	Apr 14, May 22, June 13.....	G R Spence.....	310 Pine St
Sierra Nevada S M Co., Nevada.....	39.....	50c.....	May 13, June 13, June 27.....	E Parker.....	309 Montgomery St
Sylvania M Co., Nevada.....	1.....	31.50.....	Mar 14, Apr 28, May 28.....	J J Scoville.....	4 Suter St
Teresa M Co., Mexico.....	3.....	10c.....	Mar 28, May 1, May 19.....	A Chemnaut.....	328 Montgomery St
Umpire M Co., Oregon.....	3.....	2c.....	March 27, May 4, May 22.....	A Chemnaut.....	328 Montgomery St
Utah Cons M Co., Nevada.....	12.....	25c.....	May 6, June 12, June 30.....	T F Norman.....	309 Montgomery St
Valley View M Co., California.....	1.....	2c.....	Apr 13, May 18, June 8.....	W T Gurutt.....	309 Pine St
Yellow Jacket M Co., Nevada.....	48.....	50c.....	Apr 14, May 16, June 20.....	W H Blauvelt.....	Gold Hill

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Calistoga Cons M Co.....	H S Fitch.....	331 Pine St.....	Annual.....	June 1
Cardinal Cons Co., Land & Imp Co., L & A.....	L A Kelly.....	328 Montgomery St.....	Special.....	May 25
Crown Point M Co., Nevada.....	J Newman.....	329 Pine St.....	Annual.....	June 1
Piedmont G & S M Co., Nevada.....	J J Scoville.....	329 Sansome St.....	Annual.....	May 21
Silver Hill M Co., Nevada.....	D O Bates.....	309 Montgomery St.....	Annual.....	May 25

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M Co.....	T Wetzel.....	320 Sansome St.....	10.....	May 18
North Banner Cons M Co., California.....	T J Mitchell.....	Grass Valley.....	70.....	Apr 20
North Star M Co., California.....	D A Jennings.....	401 California St.....	50.....	Apr 8
Jackman M Co.....	W R Drake.....	311 Pine St.....	10.....	Jan 19
Pacific Coast Borax Co., California.....	A H Clough.....	230 Montgomery St.....	1 00.....	May 11

Mining Share Market.

Mining shares, so far as the Comstock are concerned, had the dumps the past week, with quite a decline in the prices of those that had made the most decided up move. Persons who give close attention to the workings of the market, and conservatively judge the why and whereof of the moves, were prepared for the setback which took place. Their opinion is grounded upon the work going on in the mines and also the position of shares. They also claim that there can be no doubt but the managers of two or more of the mines have turned the work in their respective mines with the view of making an ore strike, and the preliminary movement to it has been and still is the concentration of stocks at as low prices as possible and then deal them out on the public at higher prices on big ore develops, prospective or actual dividends or on anything else calculated to excite the cupidity of the more credulous. That a fair to large showing of ore can be made to the west in any of the mines is generally conceded by old and experienced Comstock miners, but in which it will be made so as to make a stock deal is an open question, which time can only solve. The setback the past week caused weak bidders and timid dealers to throw their stocks on the market, and as bear points were circulated thick and fast, it is unreasonable to suppose that other outside dealers bought much. At this writing it looks as if the market will advance within the next four weeks to a higher range of prices than has been reached on the present deal.

Mining shares opened this (Thursday) morning fairly firm at a slight advance on last night's closing. The 30 per cent setback this week uncovered quite a line of stocks on margin. The market acts to-day as if it is about bottom, and that much higher prices will obtain soon.

At the East, large speculators, in general, look for more active and higher markets for railroad and other securities this fall. This opinion is based on the outlook being favorable for large crops and good prices, which always create speculation.

Owing to numerous inquiries it has been decided to run, at an early day, a map of the Comstock showing the Comstock lode or White ledge and the Red or west lode. This will convey a good idea to our patrons of the two lodes.

News from the Comstock report two mills are running on Con. Virginia ore, and they also indicate higher battery assays, but whether they will be higher remains to be seen. That they can be advanced up to over \$50 a ton is the current belief among miners. Best and Belcher after "running away" from the ore body, have started for it; probably enough stocks have been bought during the last decline to warrant this move. It is claimed that Sierra Nevada levied an assessment to get the public to sell stock, and afterward show up the ore in the west. The work going on in Ophir and Union is quite important. Gould & Curry continue to send ore to the mill; the assays are lower than private advices report. In Hale & Norcross they are opening out new levels. In Savage, they have started an important crosscut on the 1100-foot. Unless the work is stopped they will run into rich ore. In Con. Imperial and Challenge a joint crosscut is being run for ore known to exist to the west. The north drifts being run by Confidence and Challenge ought to open up several very important levels for future work. In Crown Point, Belcher, Kentuck and Yellow Jacket the prospecting work being done ought to develop into something quite important in the near future. Overman, Chollar, Con. Imperial, Chollar and Savage continue to send their regular quota of ore to mill. The battery assays go from \$18 to \$23 a ton.

Complimentary Samples.

Persons receiving this paper marked are requested to examine its contents, terms of subscription, and give it their own patronage, and, as far as practicable, aid in circulating the journal, and making its value more widely known to others, and extending its influence in the cause it faithfully serves. Subscription rate, \$3.00 a year. Extra copies mailed for 10 cents, if ordered soon enough. If already a subscriber, please show the paper to others.

SINCE the 1st of January 62 mining companies have paid dividends amounting to \$4,846,270.

Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING Apr. 23.	WEEK ENDING Apr. 30.	WEEK ENDING May 7.	WEEK ENDING May 14.
Alpha.....	1.25 1.45	1.25 1.35	1.20 1.50	1.25 1.50
Alta.....	1.10 1.45	1.10 1.20	1.10 1.20	1.15 1.31
Andes.....	1.40 1.75	1.35 1.55	1.45 1.60	2.75 3.45
Belcher.....	2.70 3.05	2.45 2.75	1.50 3.25	3.25 3.40
Belle Isle.....	6.25 7.75	5.50 6.50	5.50 6.50	6.00 6.00
Best & Belcher.....	2.15 2.80	2.35 2.65	3.15 2.25	2.50 2.90
Bodie Con.....	1.20 1.45	1.15 1.25	1.10 1.30	1.29 1.35
Bulwer.....	40 40	35 35	40 40	45 45
Chollar.....	1.20 1.35	1.10 1.15	1.10 1.15	1.10 1.10
Con. Va. & Oal.....	12.50 14.75	12.50 14.75	14.12 20.40	15.75 19.00
Challenge.....	2.20 2.75	2.25 2.45	2.25 2.75	2.50 3.00
Chollar.....	3.05 3.70	2.65 3.10	2.65 3.50	3.20 3.95
Confidence.....	6.10 6.50	6.00 6.50	6.75 6.75	7.37 7.37
Con. Imperial.....	1.20 1.35	1.10 1.20	1.10 1.20	1.10 1.10
Caledonia.....	75 85	70 75	75 85	90 110
Crown Point.....	2.50 2.90	2.25 2.60	2.40 2.90	2.50 3.00
Crocker.....	25 30	25 30	25 30	25 30
Del Monte.....	20 30	35 45	25 35	35 39
East & West.....	30 30	30 30	40 37.5	40 37.5
Eschschuer.....	.85 1.05	.81 .90	.85 1.08	.90 1.10
Grand Prize.....	.20 .20	.25 .25	.25 .25	.25 .30
Gould & Curro.....	3.30 3.70	3.10 3.45	3.30 4.00	3.40 4.40
Hall & McRossa.....	3.30 4.15	3.20 3.60	3.35 4.15	3.20 5.95
Julia.....	.20 .20	.20 .20	.20 .20	.20 .20
Justice.....	.25 1.35	1.20 1.30	1.20 1.35	1.40 1.40
Kentuck.....	.35 .40	.30 .35	.31 .40	.75 .85
Lady Wash.....	.40 .60	.35 .40	.40 .40	.40 .50
Leona.....	.80 .80	.80 .80	.70 .70	.70 .70
Mexican.....	2.40 4.75	3.75 4.90	4.20 5.37	4.40 6.12
Navajo.....	.30 .30	.35 .40	.30 .40	.25 .40
North Belle Isle.....	.80 .90	.85 1.10	.80 1.00	.80 .85
New Queen.....	.40 .50	.50 .60	.45 .50	1.00 1.00
Northmont.....	1.40 1.40	1.40 1.40	1.40 1.40	1.40 1.40
Ophir.....	6.87 8.12	6.25 7.75	7.12 9.39	7.12 9.00
Overman.....	3.60 3.95	3.30 3.70	3.60 3.95	3.45 4.40
Potter.....	4.40 5.00	4.05 4.65	4.25 5.25	4.20 5.12
Peerless.....	.20 .25	.20 .25	.15 .15	.15 .20
Peerless.....	.20 .20	.20 .20	.15 .15	.15 .20
Savage.....	.30 3.40	3.00 3.30	3.60 4.00	3.10 3.25
S. B. & M.....	1.35 1.45	1.15 1.35	1.20 1.35	1.75 1.75
Sierra Nevada.....	3.15 3.70	3.30 3.60	3.25 3.60	3.30 4.05
Silver Hill.....	.35 .35	.25 .25	.30 .30	.35 .35
Scorpion.....	.40 .40	.40 .40	.40 .40	.40 .40
Union Con.....	3.75 4.31	3.50 4.15	3.95 5.00	4.00 4.00
Utah.....	1.10 1.30	1.20 1.10	1.15 1.30	1.45 1.45
Yellow Jacket.....	2.75 3.20	2.85 2.60	3.20 2.80	3.20 3.25

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MAY 5, 1891.

- 451,550.—SHEET METAL ROOFING—J. C. Bayer, Portland, Or.
451,803.—LADDER—G. T. Campbell, S. F.
451,648.—TRACTION ENGINE—N. L. Darling, Benicia, Cal.
451,857.—CABLE GRIP—J. J. Graff, S. F.
451,668.—NIPPERS—D. A. Hamilton, Heppner, Or.
451,712.—WATCHMAKERS JEWEL SETTING CUTTER—A. Hartung, Nevada City, Cal.
451,594.—BORING MACHINE. A. M. Jewell, S. F.
451,595.—BORING MACHINE. A. M. Jewell, S. F.
451,765.—VALVE GEAR FOR ORE STAMPS—C. Kendrick, Jr., Nevada City, Cal.
451,608.—HORSE TAIL HOLDER—J. W. Lindsay, Fresno, Cal.
451,839.—ANIMAL TRAP—John Picard, St. Paul, Or.
451,530.—WASHING MACHINE—Z. W. Shields, Harrington, Wash.
451,531.—NEUTRALIZING SULPHO-CHLORINATED OILS—A. Sommer, Berkeley, Cal.
451,626.—STRATIFIED BRICK—L. A. Steiger, San Jose, Cal.
451,783.—SHINGLE—R. P. Taylor, Gold Hill, Nev.
451,655.—VETERINARY INHALER—H. T. Welch, San Jose, Cal.
451,544.—RAILWAY RAIL COUPLING—J. T. Wicker, Sprague, Wash.
451,586.—INSULATE ELECTRIC CONDUCTOR—J. B. Williams, Oakland, Cal.
451,587.—INSULATE ELECTRIC CONDUCTOR—J. B. Williams, Oakland, Cal.

The following brief list by telegraph, for May 12, will appear more complete on receipt of mail devices:

California—San Francisco: Peter Barclay, street-railway rail and pavement; Nora M. Barrett, gas engine attachment; Charles E. Naylor, safety-grip brake for cable cars; Franz Smith, door manipulator. Oakland—James L. Crittenden, drain pipe for buildings; Frank A. Huntington, power street-paving machine; Jas. B. Williams, treating conductors. Nevada City—Amelia Fogeh, fruit-picker. Alameda—Adolph Lajeunesse, weather strip. Oregon—Portland: Craig H. Murray, bedstead, tablet. Washington—Seattle: Emma C. Hudson, house-door letter box; Wm. R. Phillips, hydraulic air-compressor. Spokane Falls—John McKinnon, clothes-drier. Montezuma—Michael Reilly, rotor stop and driving cable.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

VETERINARY INHALER.—Henry T. Welch, San Jose. No. 451,655. Dated May 5, 1891. The object of this invention is to provide an inhaler which is specially adapted for horses and which by reason of its construction can be readily and securely applied in a way that will not inconvenience the horse. The inhaler consists of a hollow medicine-receptacle having top perforations and bent to fit the upper lip of the horse below the nostrils.

TRACTION ENGINE.—N. L. Darling, Benicia, assignor to Benicia Agricultural Works. No. 451,648. Dated May 5, 1891. This invention presents certain features of novelty, among which may be noted a compact form of boiler engine, bed-piece, driving and steering wheels, power being transmitted from the engine to the driving wheels by means of sprocket wheels and driving chains in place of the gears which are usually employed. The driving wheels are of very large diameter, and are specially constructed with a view to strength. The bed-piece of the engine is peculiarly constructed so as to make it very compact, at the same time providing sufficient room for the eccentrics and valve gear without unduly lengthening the engine shaft. A peculiar clutch mechanism is employed to connect the engine shaft with its driving sprocket wheel, or disconnect it therefrom, and a suitable equalizing gear is fitted to the counter-shaft from which the power is transmitted to the two driving wheels. Another peculiarity of the engine is in the construction of a truss frame whereby great strength and rigidity is effected, and through the agency of which the draft bar is connected with the engine at a point low down, and in such a manner that a heavy draft tends to hold the engine down upon the ground instead of lifting it up.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

EAST OAKLAND RAILROAD CO., May 9. Capital stock, \$250,000. Directors—E. C. Sessions, C. E. White, E. P. Vandercook, R. F. Crist and W. R. Melvin.

PACIFIC COAST AMUSEMENT DEVICE CO., May 9. Object, to introduce, rent and sell rotary toys, amusement devices, fortune-telling machines, nickel-in-the-slot machines, and other kinds of toys. Capital stock, \$100,000. Directors—James W. Hartley, Achilles Ross, Shaller Howard, W. R. Gouldberg and Alfred Bouvier.

BELDING CONS. M. CO., May 13. Location, Esmeralda Co., Nev. Capital stock, \$5,000,000. Directors—W. J. Sutherland, H. Zading, G. R. Wells, N. T. Spencer and Chas. Hersfield.

THE Gould & Curry Mining Co. has received \$11,406.03 as the net proceeds of amalgam from 1120 tons of ore worked at the Nevada mill, which was sold to the Carson mint.

Assessment Notices.

GRAY EAGLE MINING COMPANY.—Location of principal place of business, San Francisco, California. Location of works, Placer County, California. Notice is hereby given, that at a meeting of the Board of Directors, held on the 3d day of April, 1891, an assessment, No. 23, of Three (3) Cents per share, was levied upon the Capital Stock of the Corporation, payable immediately in United States Gold Coin to the Secretary, at the office of the Company, Room 11, No. 303 California Street, San Francisco, California.

Any stock upon which this assessment shall remain unpaid on the 15th day of May, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on TUESDAY, the 5th day of June, 1891, to pay the delinquent assessment, together with costs of advertising and expenses of sale.

By order of the Board of Directors.
A. W. BARROWS, Secretary pro tem.
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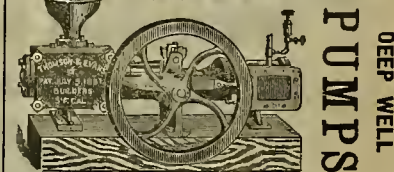
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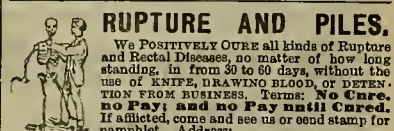
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Cor. Beale and Howard Sts., San Francisco.

FRANCIS SMITH & CO.
Manufacturers of

Sheet Iron and Steel
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ALL SIZES,
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Iron cut, punched and formed, for making pipe on ground. All kinds of Tools supplied for making Pipe. Estimates given. Are prepared for coating all sizes of Pipe with a composition of Coal Tar and Asphaltum.



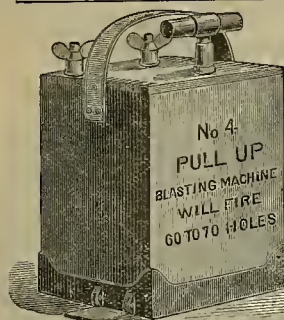
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We POSITIVELY CURE all kinds of Rupture and Rectal Diseases, no matter of how long standing. In from 30 to 60 days, without the use of KNIFE, DRAWING BLOOD, or DETENTION FROM BUSINESS. Terms: No Cure, no Pay; and no Pay until Cured. If afflicted, come and see us or send stamp for pamphlet. Address:

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Send for Catalogue.

VICTOR ELECTRIC PLATINUM FUSES.
Superior to all others for exploding any make of dynamite or blasting powder. Each fuse folded separately and packed in neat paper boxes of 50 each. All tested and warranted. Single and double strength, with any length of wires.

VICTOR BLASTING MACHINE.—Made in two sizes. No. 2 fires 20 to 30 holes. No. 1 fires 5 to 8 holes. Adapted for prospecting, stump blasting, quarry and general railroad work.

"PULL UP" BLASTING MACHINE.—The strongest and most powerful machine ever made for Electric Blasting. No. 4 size fires 70 holes. No. 3 size fires 40 holes. Are especially adapted for submarine blasting and large mining work.

Standard Electric Fuse and Blast Tester, Wire Reels, new design, Leading and Connecting Wire.

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ALL WORK TESTED AND GUARANTEED.

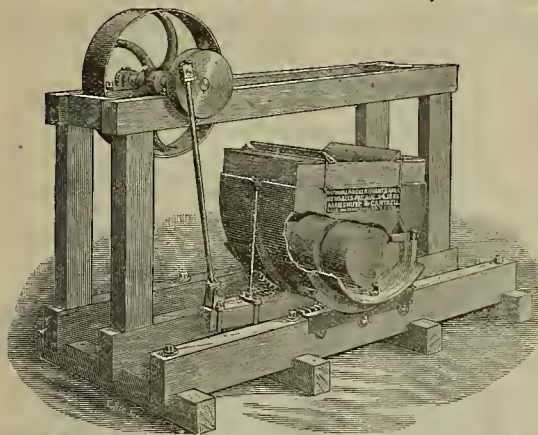
IMPROVED PORTABLE HOISTING ENGINES.

NATIONAL ROCKER QUARTZ MILL.

KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY. 12 Tons in 24 Hours. 3 H. P.

MARSHUTZ & CANTRELL, Sole Manufacturers.



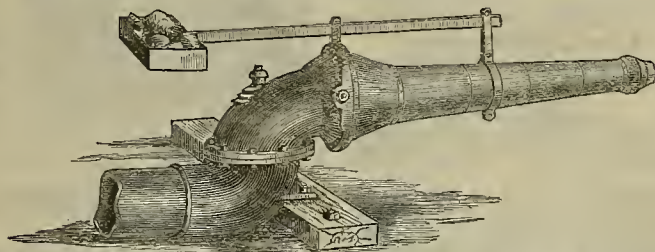
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The Patentee and Manufacturers cordially invite miners to critically examine and pass judgment upon this improved system of milling and amalgamating ores in the following particulars:

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6. There is no wear except on shoes and dies.
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We challenge competition with Stamps, Ball Pulverizers or and other ore crushing machines now before the public.

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THE ABOVE CUT ILLUSTRATES THE IMPROVED FORM OF DOUBLE-JOINTED HYDRAULIC GIANTS which we manufacture. We guarantee purchasers of this form of Giants against all costs, expenses or damages which may arise from any adverse suits or actions at law. We are further prepared to furnish Single-Jointed Giants when required. Prices, discounts and Catalogues of our specialties of Hydraulic Mining Machinery sent on application.

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**SQUARE FLAX PACKING.**

MANUFACTURED FROM STRICTLY FIRST-CLASS FLAX AND PURE LUBRICANTS. HAS NO SUPERIOR for all Hydraulic Work.

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The red cord runs the entire length. Put up in boxes of 20 feet, or coils of 60 to 80 lbs. For sale by all dealers. W. T. Y. SCHENCK, Sole Manufacturer, 222 and 224 Market Street, San Francisco, Cal.

Adamantine Shoes and Dies—AND—**CHROME CAST STEEL**

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THESE CASTINGS ARE EXTENSIVELY USED IN ALL THE MINING STATES and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to above conditions. When ordering send sketch with exact dimensions. Send for Illustrated Circular.

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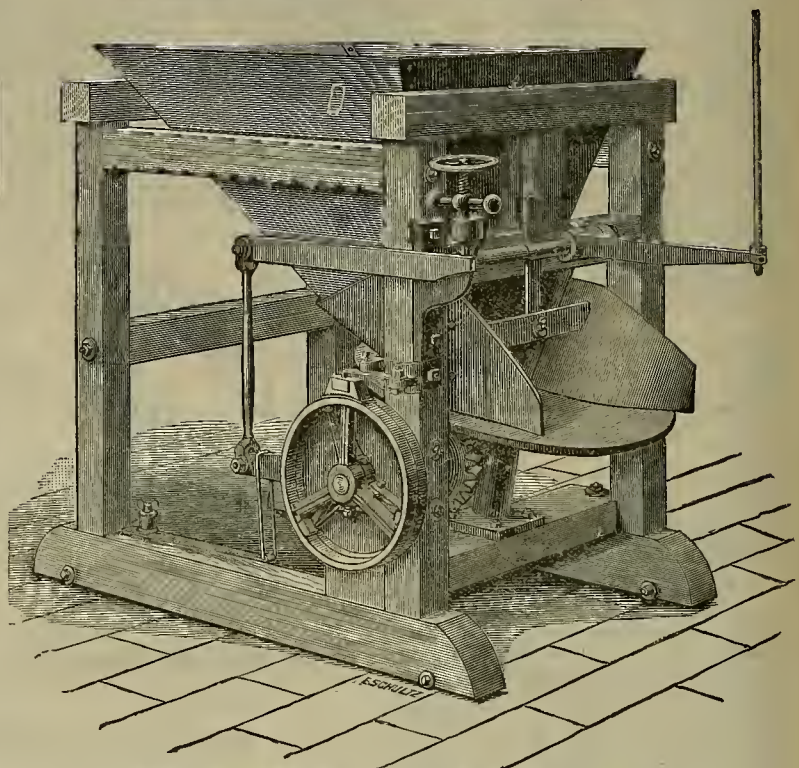
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Stamp Cam.

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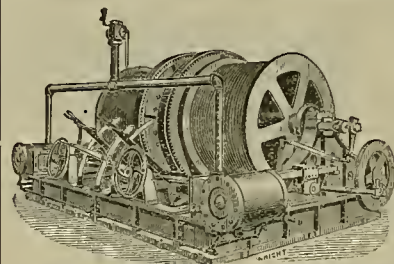
The best form of Feeder ever devised, and pronounced by reputable mining men to be far superior to any form of "Roller" Feeder manufactured. We refer to the following gentlemen who have furnished us with testimonial letters to the above effect, which can be seen at our office, viz:

N. W. CROCKER, Supt. Bunker Hill Gold Mining Co., Amador City, Cal. | D. C. WICKHAM, Taylor Mine, Greenwood, Cal.
J. R. TREGLOAN, Supt. South Spring Hill Gold Mining Co., Amador City, Cal.

WE ARE MANUFACTURERS OF THE

"CHALLENGE", "STANFORD", "TULLOCK", & "ROLLER" FEEDERS,

And will furnish descriptive Catalogue and quote prices upon application.

HOISTING ENGINES FOR MINES

1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.

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For BOILERS, STEAM PIPES, COLD STORAGE, and all places requiring Non-Heat-Conducting Material.

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INVENTORS on the Pacific Coast will find it greatly to their advantage to consult this old, experienced, first-class Agency. We have able and trustworthy Associates and Agents in Washington and the capital cities of the principal nations of the world. In connection with our editorial, scientific and Patent Law Library, and record of original cases in our office, we have other advantages far beyond those which can be offered home inventors by other agencies. The information accumulated through long and careful practice before the Office, and the frequent examination of patents already granted, for the purpose of determining the patentability of inventions brought before us, enables us often to give advice which will save inventors the expense of applying for Patents upon inventions which are not new. Circulars of advice sent free on receipt of postage. Address DEWEY & CO., Patent Agents, 230 Market St., S. F.

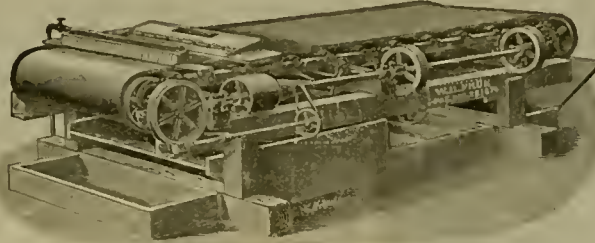
IMPROVED BELT FRUE ORE CONCENTRATOR.

The Best Ore Concentrator in the market, having double the Capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, crushing 350 tons per day, and is giving entire satisfaction as against 48 plain Belt Machines, taking the Pulp from the other 120 Stamps.

Price of Improved Belt Frue Vanner, \$825, f. o. b.
Price of Plain Belt Frue Vanner, \$575, f. o. b.

For Pamphlets, Testimonials and further information apply at office.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., Room 15, No. 132 Market Street, San Francisco, Cal.



Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

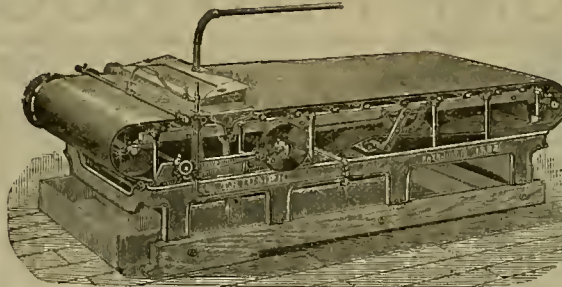
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt - - - \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.



JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)

Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.

GRASS VALLEY, NEVADA CO., CAL., NOV. 10, 1885.

Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices. DAVID McKAY, JR.,
(Signed) Sup't North Star and Original Empire Mining Co.

N. B.—When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

PARKE & LACY COMPANY

—IMPORTERS AND MANUFACTURERS OF—

MINING, MILL and GENERAL MACHINERY.

ENGINES, BOILERS, STEAM PUMPS,

AIR COMPRESSORS, ROCK DRILLS,

WALL'S CRUSHING ROLLS,

CONCENTRATORS, PULVERIZERS,

TURBINE WATER WHEELS,

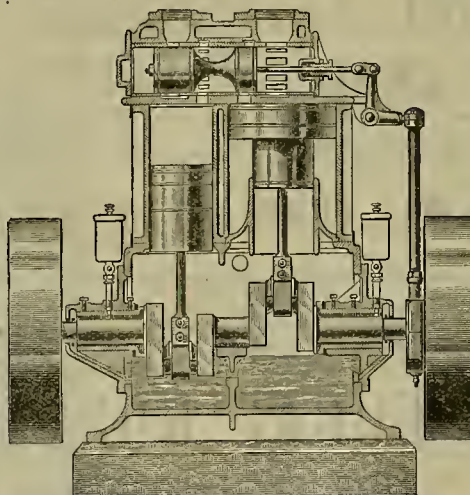
ROCK BREAKERS, DRY JIGS.

Bullock's Diamond Drills

GOLDEN GATE CONCENTRATORS,

GREATEST CAPACITY OF ANY CONCENTRATOR MADE,

One Machine Taking Pulp from 10 Stamps.



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COMPOUND, 44 ENGINES,
5215 HORSE POWER.

SALES DURING LAST FOUR MONTHS:
STANDARD, 99 ENGINES,
4500 HORSE POWER.

JUNIOR, 166 ENGINES,
4260 HORSE POWER.

Grand Total, 309 Engines, Aggregating 12,975 Horse Power.

21 and 23 Fremont St., San Francisco, Cal.

189 Clarence St., Sydney, N. S. W.

RAND DRILL COMPANY,

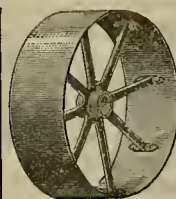
ROCK DRILLING, AIR COMPRESSING,
MINING AND QUARRYING

MACHINERY,

23 PARK PLACE, NEW YORK,
U. S. A.



DEWEY & CO., { 220 MARKET ST. S. F. } PATENT AGENTS.
Elevator, 12 Front.



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

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Sole Licensed Manufacturers of the

MEDART PATENT WROUGHT RIM PULLEY

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

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For information concerning this process for the reduction of Ores containing precious metals, and terms of license, apply to

THE RUSSELL PROCESS CO.,
Park City, Utah.

TUBBS CORDAGE CO.

(A Corporation.)

Constantly on hand a full assortment of Manila Rope, Duplex Rope, Tanned Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

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GIVES THE HIGHEST EFFICIENCY OF ANY WHEEL IN THE WORLD. OVER 1300 IN USE.

Affords the most simple and reliable power for all mining and manufacturing machinery. Adapted to heads running from 20 up to 2000 or more feet. From 20 to 30 per cent better results guaranteed than can be produced from any other wheel in the country.

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The advantages the Pelton Wheel affords in the way of a uniform and reliable power, close regulation, and the facility of adaptation to varying conditions of speed and pressure, have brought it into special prominence and extensive use for this class of work.

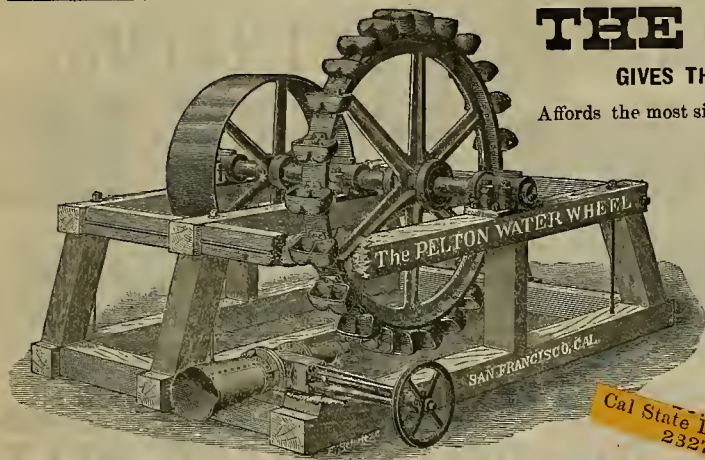
All applications should state amount and head of water, power required and for what purpose, with approximate length of pipe line. SEND FOR CATALOGUE.

THE PELTON WATER WHEEL CO.

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PELTON WATER MOTORS.

Varying from the fraction of 1 up to 15 and 20-horse power, unequaled for all light-running machinery. Sent to develop a given amount of power with one-half the water required by any other. MOTOR CIRCULAR. Address as above.



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UNLIMITED IN CAPACITY, UNEQUALED IN EFFICIENCY, UPWARD OF 3000 NOW IN USE.

Will do more than twice the work of any other with the same cost in wear.

Gives a fineness of product that increases the capacity of any mill from 25 to 40 per cent without any additional expense. THE BEST AND ONLY CRUSHER ADAPTED TO MACADAM ROAD WORK. Send for Circular.

THE PELTON WATER WHEEL CO., 121-123 Main Street, San Francisco, General Western Agents.



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IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates Replated, Bought, or Gold Separated. THOUSANDS OF ORDERS FILLED.

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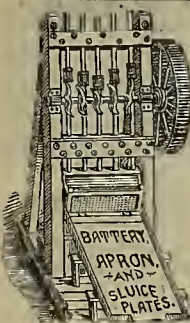
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E. G. DENNISTON, Proprietor.

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Our Plates have been used for 20 years. They have proved the best. We adhere strictly to contract in weight of Silver and Copper.

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RECEIVED EVERY MEDAL Awarded on the Pacific Coast for Silver-Plated Amalgam Plates and Best Gold, Silver and Nickel Plating.

F. A. HUNTINGTON.

—MANUFACTURER OF—

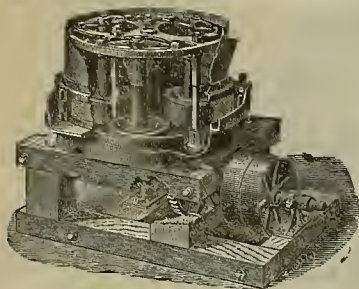
CENTRIFUGAL ROLLER QUARTZ MILLS,

Concentrators and Ore Crushers,

Mining Machinery of Every Description.

Steam Engines and Shingle Machines.

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Centrifugal Roller Quartz Mill.

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SAN FRANCISCO, CAL.

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DIXON'S Lead Pencils	DIXON'S Stove Polish	DIXON'S Crucibles.	DIXON'S GRAPHITE PAINT. For all Iron and Wood Work. Covers twice the surface of any other paint.		DIXON'S Axle Grease	THE PACIFIC PROSPECTING CO. will contract to prospect with Diamond Core Drill for minerals, etc. or to bore holes for ventilation or drainage. Agents for Diamond Drills, Rock Drills, Mining Machinery and Supplies of all kinds. Diamonds on hand. Inquiries and orders promptly attended to. 18 Sansome Street, San Francisco, Cal.	
SOLD BY ALL DEALERS.							
J. G. ALLEN, Agent, 304 Market Street, San Francisco, Cal.							

THE GIANT POWDER COMPANY

Manufacture Three Kinds of Powder, which are acknowledged by all the Great Chemists of the World as

The Safest and Strongest High Explosives in the Market.

GIANT POWDER or DYNAMITE,

Of Different Strengths as Required.

NOBEL'S EXPLOSIVE GELATINE," which contains 94 per cent of Nitro-Glycerine, and GELATINE-DYNAMITE, Stronger than Dynamite and even Safe in Handling.

JUDSON POWDER IMPROVED.

FOR RAILROADS AND LAND CLEARING. Is from three to four times stronger than ordinary Blasting Powder, and is used by all the Railroad and Gravel Claims, as it breaks more ground, pulverizes better and saves time and money. It is as dry as the ordinary Blasting Powder and runs as freely.

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CAPS and FUSE for Sale.

GENERAL AGENTS, SAN FRANCISCO CAL.

LEVIATHAN COTTON BELTING.

Superior to all Others for Quartz Mills, Smelters, &c.

Not Affected by Wet, Steam, Heat or Oils. Every Belt Guaranteed. Try It. Send for Circular and Samples.

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An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXII.—Number 21.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, MAY 23, 1891.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Retorts and Melting Furnaces.

Various styles and sizes of retorts are in use in the mills of this coast. Gold mills require much less retorting capacity than silver mills of the same size. Many small gold mills use the sample "pot" retort, shown in the cut, which is portable and can be used on an ordinary forge, or in a temporary furnace prepared for the occasion. It is, however, more economical and satisfactory to have all retorts placed in permanent settings.

The accompanying cuts show the smaller pattern of cylinder retorts and melting furnaces combined in one setting, such as are used in gold mills and small silver mills. After being thoroughly strained, the amalgam is placed in the retort in suitable iron pans. The retort is then sealed except the vapor discharge pipe, the open end of which is placed under water in the condensed tank. A water jacket condenser is fixed to and surrounds the vapor pipe through a continual supply of cold water flows condensing the vaporized quicksilver while passing through it to the settling tanks.

The time required to retort a charge of amalgam depends largely upon circumstances, and varies from one to four hours.

Other cuts on this page represent the Standard 14x60 "oil" retort embodying Mr.

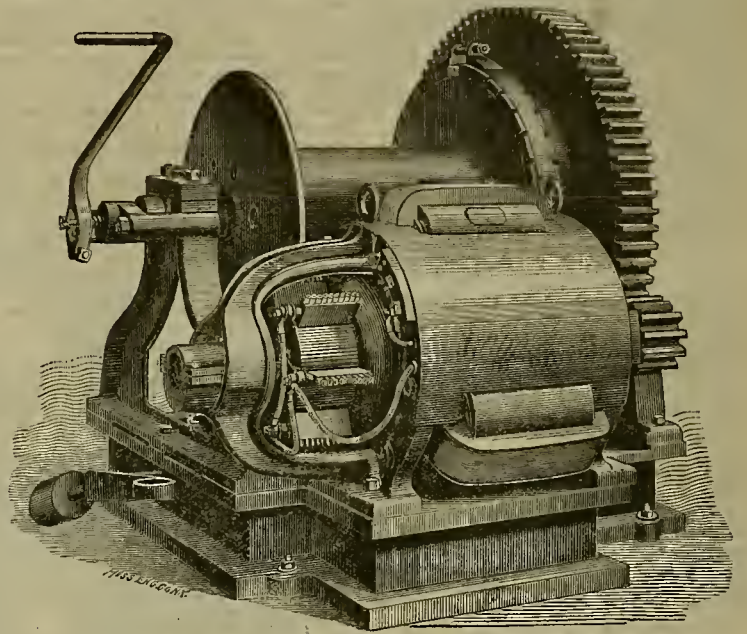
Boss' improvements, by which the usual objectionable bearing bars are dispensed with, the retort having a series of brackets cast on the sides which rest on the brick walls, exposing the entire lower surface of the retort to the fire, and insuring a uniform distribution of heat to all parts of the retort. The bands which surround the retort prevent warping.

Its supporting brackets are placed centrally, so as to admit of turning the retort over and using both sides, thus increasing its life materially. These forms of retorts are manufactured by the Riedon Iron Works of this city.

Perret Single Reduction Electric Hoist.

The introduction of the Perret slow-speed multiplier motor, a year or so ago, marked a new era in the history of electric power, and the remarkable success attained by this motor has resulted in overthrowing the very general opinion which at that time prevailed, that slow-speed multiplier motors were impracticable. These motors have since been applied to almost every conceivable kind of work requiring single reduction or direct gearing, and have proved a decided success.

We illustrate, as above, an Electric Dock Hoist, brought out several months since by the Elektron Mfg. Co. This is a piece of machinery



PERRET SINGLE REDUCTION ELECTRIC HOIST.

every where single reduction is particularly desirable, on account of the saving in space, noise, friction and consumption of current. The motor is a 15-horse power Perret multiplier, making 450 revolutions per minute, geared by a gun metal pinion to a 38-inch gear, on the drum shaft of hoist. The drum is one foot in diameter, giving a speed on hoisting rope of a little over 200 feet per minute.

The motor is shunt wound, and drives the gear-wheel at a constant speed, which may be increased, if desired, by the introduction of resistance in the field circuit. By depressing the hand lever, the hoisting drum is forced against a friction device, revolving with the gear-wheel and lifts the load, its speed varying with the pressure on the lever. To lower the load the foot lever is depressed and the hand lever raised. The whole machine is very compact and simple, and is built to stand rough dock usage. The motor is water-proof, and has all the latest improvements.

The American Order of Architecture.

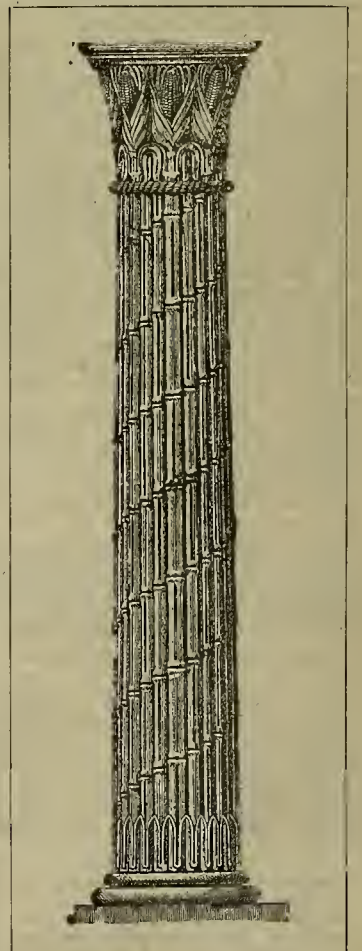
We present herewith a cut of a column to show the advancement we are making in local art and architecture. The column is an exact reproduction of those in the lower vestibule of the capitol at Washington.

These columns were eight in number and small, being only eight inches in diameter, and stand in the Capitol beneath the office of the United States Marshal. They constitute the first bold stride toward forming for ourselves an ornamentation peculiarly in keeping with our new and vigorous government.

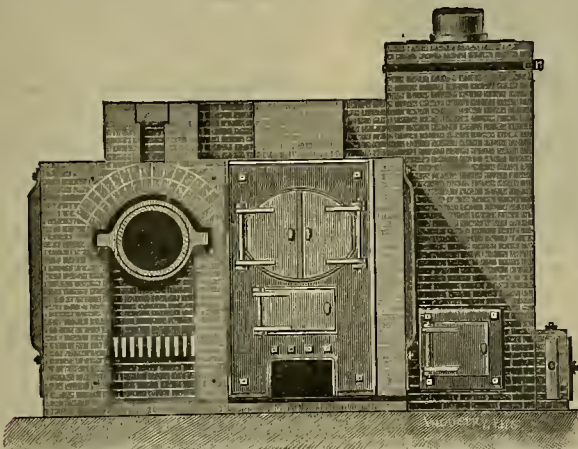
These diminutive pillars have stood alone in their unnoticed portion of the Capitol—the only specimens of a purely American order of architecture in existence—until now Col. Jackson has reproduced them at his Springs in a much more pretentious and magnificent form.

His columns are 12 in number, 24 feet in height and two feet in diameter. Each column is composed of a cluster of Indian corn-stalks bound together so that the joints of one stalk stand slightly above the preceding one; thus by the recurrence of the joints in the seven divi-

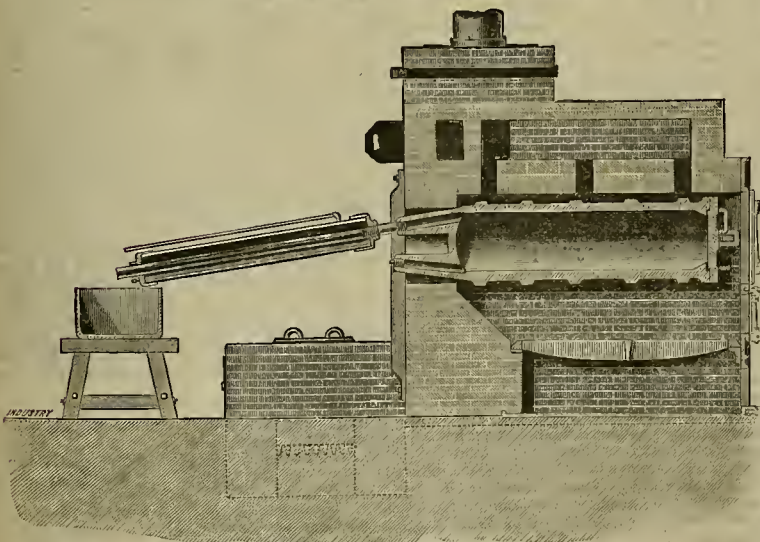
sions of every stalk, a spiral effect is produced. The capitals are composed of ears of corn with the half-open husks, displaying the corn which stands out at an angle to the main column.



AN AMERICAN COLUMN



CYLINDER RETORT FOR SMALL MILLS.



IMPROVED CYLINDER RETORT WITH BOSS' IMPROVEMENT.

Common Names for California Trees.

[Written for the Press by J. G. LEMMON]

There is much confusion in the use of common or vernacular names for our forest trees.

Our most familiar species have been given each a dozen or more names, while in many instances the same name is applied to a dozen or more species. These names conferred by the early settlers are often based upon some local feature or passing fancy, which, when the subject of them is better known, become totally inappropriate or viciously misleading. It is desirable to correct, if we may, this erratic treatment of our trees.

As long ago as 1878, when the distinguished botanists, Sir Joseph Hooker, Drs. Asa Gray, George Engelmann and O. C. Parry were making a hurried examination of the forests of the Northwest, the writer hasought these great authorities to select from the host of names given loosely, to our trees, one the most appropriate for each of our species, and to sanction its exclusive use thereafter.

One of the savants regarded the proposition as a good one; another promised that it should be done before they separated; a third thought they had not time then to perform so important a work, while the fourth declared that such a thing could never be accomplished. "The lumbermen, hunters and travelers," he said, "will always be giving names to objects however bad they may be in themselves, or misleading they might become."

Nothing came of my suggestion, and the confusion of names has increased apace, owing to the increased attention given to our trees by this visit of the Eastern scientists and by later publications.

In the extended articles of the Botanists' Reports, included in the 2d and 3d Biennial Reports of the California State Board of Forestry, an attempt is made while elaborating the great class of *Coniferae*, or cone-bearers, to bring order out of the confusion of names, by selecting the least objectionable name in common use; or, in a few instances, coining a new one for each of the kinds of trees, and then using this one habitually in subsequent discussions, hoping thereby to set the example of uniformity and precision.

This effort has been so much commended of late that I yield to an urgent request to publish abbreviated descriptions of our forest trees, just sufficient to bring out the characters upon which are based the vernacular names for the groups as well as species. The following descriptive list has been prepared for our largest family of trees—the pines. Later, it may be followed by a similar list of the rest of the cone-bearing trees.

Descriptive List of Groups and Species of California Pines.

CLASS I. SMOOTH-CONED, SHORT-LEAVED WHITE PINES.

Cones smooth, devoid of protuberances, prickles or hooks; seeds large, leaves in 5s. Wood usually lighter-colored, softer and less resinous than that of the other class. Four species in two groups of a pair each.

GROUP 1. LONG CONED, LUMBER PINES.—Cones long, narrow, cylindrical, 8 to 22 inches long and 1 to 4 inches thick, on long stems becoming pendent and breaking at maturity. Trees usually very large with grayish, finely checked bark, large and long upper bearing limbs and light-green foliage.

No. 1—*Pinus Lambertiana*, Dougl., "Great Sugar Pine."—Trees of the largest dimensions, 120 to 300, or, favorably situated, 250 to 300 feet high and 10 to 20 in diameter; scattered among other trees of the Coast and Sierra mountains at middle elevations. Cones very long, 10 to 22 inches long—the longest known.

No. 2—*Pinus monticola*, Dougl., "Mountain Pine."—Smaller, lighter harked trees than the preceding in sub-alpine regions of the Sierra, but northward in Oregon and Washington found at lower elevations; cones narrow, 6 to 12 inches long; scales thin, weak, reflexed at maturity.

GROUP 2. SHORT CONED, ALPINE PINES.—Dwarfed, often depressed trees forming the upper fringes of the forests on the Rocky Mts. and the Sierra Nevada.

No. 3—*Pinus flexilis*, James., "Limber-twig Pine."—Small or depressed trees of the Rocky mountains and a few on the peaks of certain mountains in the Southern Sierra.

No. 4—*Pinus albicaulis*, Engel., "White-bark Pine."—Very white harked, often depressed trees forming the timber line on certain peaks of the Sierra. Cone globose, set close upon the short, stout, erect, white, annual stems.

CLASS II. ROUGH-CONED, DIVERSE-LEAVED, PITCH PINES.

Cones rough, armed with conspicuous knobs, prickles or hooks. Wood usually darker, harder, more resinous than that of the first class. Fourteen species in two sections of two groups each.

SECTION A. SUB-TERMINAL, MOSTLY DECIDUOUS-CONED PINES.—Cones arising near the terminal leaf-bud, deciduous at maturity. Eight species in two very unequal groups.

GROUP 3. COHERENT-CONED, SHORT LEAVED, CLOSE-GRAINED PINES.—Cones small, at maturity separating from the stem entirely. Three diverse pairs of species.

1st PAIR. OBLONG-CONED, PLUME PINES.—Cones oblong, cylindrical, 3 to 5 inches long, pendent from the long, plume-like brancholets;

leaves in 5s. Sub-alpine trees of the Rocky mountains, with a few trees only on the Sierra.

No. 5—*Pinus Balfouriana*, Jeff., "Fox-Tail Pine."—A few trees in sequestered nooks near Shasta and in the vicinity of Mt. Whitney. Cones with very small prickles.

No. 6—*Pinus aristata*, Engel., "Bristle-Cone Pine."—Similar but smaller trees on a few peaks of the Southern Sierra, but chiefly in Arizona, New Mexico and Colorado. Cones with long, conspicuous, bristle-like prickles.

2ND PAIR. GLOBE-CONED, NUT PINES.—Cones sub-globose $\frac{1}{2}$ to 2 inches thick; scales few; very protuberant, without prickles, widely opening at maturity, loosely holding the large, delicious seeds.

No. 7—*Pinus monophylla*, Tor. and Frem., "Single-Leaf Pine."—Small, branching trees of the Great Basin, the eastern slopes of the Sierra, and the Tehachapi mountains; leaves solitary, terete, pungent-pointed; seeds, large, hard-shelled.

No. 8—*Pinus Parryana*, Engel., "Parry Pine."—Small trees in the peninsula of Lower California, with a few specimens extending into San Diego Co., California. Cones smaller than the preceding, with soft-shelled seeds; leaves in 5s.

3D PAIR. THIMBLE-CONED, THIN-BARK PINES.—Cone very small, 1 to 2 inches long, strongly declined; leaves in pairs. Trees with exceptionally thin bark and small cones.

No. 9—*Pinus contorta*, Dougl., "Scrub Pine."—Very small, scrubby trees, on and near the northwest coast of California and Oregon, the very small cones often remaining on the trees for many years.

No. 10—*Pinus Murrayana*, Belf., "Tamarack Pine."—Tall, slender trees in wet, sub-alpine swamps of the Sierra and northward; also in the Rocky mountains. Cones ovate-conical, $\frac{1}{2}$ to $\frac{3}{4}$ inches long. Trees usually discharging pitch or gum. Bark only one-fourth to one-half inch thick. Wood tough and light.

GROUP 4. BROKEN-CONED, LUMBER PINES.—Cones breaking away at maturity from the short stem by an irregular, transversal fracture within the base. They are of medium size, ovate-conical, 4 to 8 inches long, and half as broad at base; leaves in 3s, 5 to 8 inches long. Large trees, with thick, deeply fissured bark, and yielding lumber of great value. Trees widely distributed at middle altitudes.

No. 11—*Pinus ponderosa*, Dougl., "Yellow Pine."—Trees of the largest size 200 to 300 feet in height; the largest often 250 to 300 feet high and 5 to 15 feet thick; bark in the typical form, yellowish or whitish, mostly very thick and deeply fissured into large plates; cones, conical-ovate, 2 to 5 inches long; male flowers, long and flexuous. The broken branchlets exhale an odor of turpentine.

Var. (a) *nigricans*, "Brown-bark Pine."—Trees of medium size flourishing usually in moist situations than other forms and longer retaining their lower limbs; sap-wood usually of many layers; cones, largest of the species, 3 to 6 inches long.

Var. (b) *Benthaimana*, "Foothills Yellow Pine."—Medium-sized trees in the coast mountains and Western Sierra foothills, usually spire-shaped; cones, smaller and narrower than the preceding.

Var. (c) *brachyptera*, "Southern Yellow Pine."—Trees of Northern Arizona and New Mexico; cones, small, ovate, 2 to 4 inches long.

Var. (d) *scopularum*, "Rocky Mt. Yellow Pine."—A small, spire-shaped tree of the Rocky Mts.; leaves often in pairs and remaining on the limbs several years.

No. 12—*Pinus jeffreyi*, Mur., "Black Pine."—Chiefly distinguished from the *ponderosa* species (with which it is often associated) by the trees attaining usually more elevated regions, and having darker, finer checked bark; the young branchlets and leaves are colored by a whitish powder; also when broken they exhale a pleasant, aromatic odor, not one of turpentine; cones, large, 6 to 10 inches long, ovate, with strong prickles.

Var. (a) *deflexa*, "Red-bark Pine."—This form constitutes one of the principal timber trees of the high Sierras, notably near Truckee. The bark is usually reddish-brown, thick, coarsely checked by many lines, especially toward the top of the tree; cones, large, 6 to 10 inches long.

Var. (b) *peninsularis*, "Peninsular Pine."—On the San Rafael mountains of Lower California; bark, grayish-brown, thick, deeply furrowed; cones, remarkably abundant and large, 6 to 8 inches long.

Var. (c) *ambigua*,—A tree of the lake region of Western Montana, "with purple cones and long glaucous foliage."

SECTION B.—LATERAL, MOSTLY PERSISTENT-CONED, LONG-LEAVED PINES.—Cones arising laterally, i. e. along the bearing stems, usually at some distance from the apex; mostly not falling at maturity, but persisting and, either becoming inclosed by the later layers of wood, or the peduncle is stretched and at length broken by the enlargement of the tree, while the cone is often carried onward confined in the bark, leaving a channel behind it to the heart of the tree. Leaves large and long, 6 to 12 inches. Six species forming a pair of trios, or groups.

GROUP 5. HEAVY, SPINE CONED, LONG-LIMBED PINES.—Cones of the heaviest, largest and hardest description on long, stout spreading peduncles, opening at maturity, but often remaining until forced off by the enlargement of the tree. Scales of the cone very large and thick, often terminating in long, stout, curved

spines or hooks; seeds very large, black, thick-shelled. Leaves in 3s or 5s, very large and long, 8 to 14 inches. Picturesque trees remarkable for their usually divided trunk or very long limbs and for their heavy, spine-bearing cones.

No. 13—*Pinus Coulteri*, Don., "Big-Coned Pine."—Trees of medium size, with dark green, abundant three-leaved foliage; composed of the largest and longest pine leaves known, 8 to 14 inches long. Cones elongated, elliptical, of matchless size and weight, 15 to 20 inches long and often weighing five to eight pounds. The outer hooks are often two to four inches long, and curved like a nail. Trees of limited range in the Southern coast ranges and San Bernardino mountains.

No. 14—*Pinus Sabiniana*, Dougl., "Gray-Leaf Pine."—Usually small, round-headed trees of the hot, sloping foot hills with divided trunks, and scant foliage of grayish color, all but the leaves of the season dropping downward, or early falling away. Cones broadly ovate, weighing 2 to 5 pounds, armed with stout, short hooks; seeds very large $\frac{1}{2}$ to $\frac{3}{4}$ inch long, with a thick, narrow wing. Leaves in 3s.

No. 15—*Pinus Torreyana*, Parry, "Torrey Pine."—A few small trees not to exceed a few hundred in all; buffeted, often prostrated by the ocean winds at Del Mar, San Diego Co., with a few on Santa Rosa Island. Leaves in 5s, very large and long, 8 to 12 inches. Cones broadly ovate, 4 to 6 inches long, weighing 1 to 2 pounds, and armed with short, stout spines.

GROUP 6. CLOSE-CONED, SLENDER PINES.—Cones in verticils or clusters, usually strongly declined, and gibbous; usually long-persistent, and remaining long-closed, holding the seed. Small trees mostly crowded into dense groves, hence tall and slender; maturing fruit when quite young. Leaves in 3s or 2s.

No. 16—*Pinus insignis*, Dougl., "Monterey Pine."—Beautiful trees on Point Pinos near Monterey, and abundant in cultivation. Leaves in threes.

Var. (a) *radiata*, "Spreading-Cone Pine."—The large-coned form near Monterey bay.

Var. (b) *levigata*, "Nearly smooth cone Pine."—Cone small, nearly smooth. Trees on the outskirts of the forest farthest from the ocean.

No. 17—*Pinus tuberculata*, Gordon, "Knob-Coned Pine."—Usually small, early bearing, slender trees on sunny slopes of the Northern Sierra, and rarely on the coast ranges. Cones strongly declined, narrow and pointed, 3 to 7 inches long. Remaining on the trees and unopened for an indefinite number of years. Leaves in 3s.

No. 18—*Pinus Muricata*, Don., "Prickle-Coned Pine."—Small slender trees usually in swampy places along a limited portion of the coast range, mostly northward from San Francisco. Cones clustered, ovate, 2 to 3 inches long with small, sharp, persistent prickles. The cones have been known to remain unopened for 20 to 30 years, then to release good seeds. Leaves in pairs, usually long, 3 to 6 inches.

The Stanford University.

Announcement is made by circular that the Stanford University will open for students October 1, 1891. For the first year, chairs will be established, and instruction will be given in the following lines of work: Mechanical engineering, civil engineering, mathematics, physics, chemistry, geology, botany, zoology, physiology, philosophy, ethics, history, political science, English language and literature, German, French, Latin and Greek.

The work of the University will begin with the freshman class. For admission to this class, the candidate must be at least 16 years of age, and must pass a satisfactory examination in the subjects specified in the circular, copies of which can be had by addressing President David S. Jordan, Menlo Park, Cal. The following announcement is made of expenses:

Tuition in all departments of the University will be free. Board will be offered at cost in the dormitories. The price fixed at present for board in Madrono Hall is \$3 per week. Rooms with light, heat and attendance are offered at \$1.50 per week for each person, if two occupy one room; \$3 per week, if occupied by one person; but single occupancy will not be permitted if the rooms are needed by other students. Washing will be charged at cost. The expenses of the student in Madrono Hall need not exceed \$200 for the year, exclusive of clothing and railway fares. The accommodations for young women will, at the first, be limited, but an effort will be made to provide suitable rooms for those who may enter the University.

President Jordan is now at the East, but will be at Menlo Park after June 10.

DUTIES ON COAL.—A decision concerning duties on coal has been received from the Board of General Appraisers at New York. R. Dunsmuir & Co. Imported by the steamer Costa Rica a cargo of bituminous coal screenings. Duty was assessed at 75 cents a ton of 2240 pounds, which is the rate prescribed for bituminous coal in paragraph 432 of the McKinley Act. The point claimed by the appellants was that the screenings would pass through a half-inch screen, and that, therefore, the duty should have been assessed at 30 cents a ton under the terms of the same paragraph. It was found by the Board of General Appraisers that 90 per cent of the coal would pass through a half-inch screen. The Board decided in favor of the protest of the importers.

San Diego Mines.

The San Diego Union says: Several thousand dollars in gold bullion were brought in from Julian on Saturday, and placed in the banks.

Work on the Stonewall mine is still in progress. "Dead work" is being prosecuted systematically. There is a great deal of unexplored ground in the Stonewall claim, to say nothing of the prospects for new mineral veins on the grant aside from the Stonewall. A number of good veins are now known, and there is little doubt that intelligent prospecting will discover others of great value, in the vicinity of the Stonewall vein.

As a matter of interest in connection with mining generally, it may be well to state that in the month of April, 40 gold, silver, copper and quicksilver mining companies declared dividends aggregating \$1,315,460, and that since January 1st, 62 companies have paid \$4,846,270.

The High Peak.

At the Helvetia mine at Julian, a force of 35 men is now employed. The shaft is down 200 feet, and has but 25 feet more to go until it will have reached the level of the deepest old workings, which are some distance away and flooded with water to a depth of 200 feet. When work ceased in the mine some years ago, a good body of quartz was left in the bottom of the mine, which carried considerable gold. When this shoot is reached it will supply the mill continuously with quartz for a long time. The rock being crushed at present from the High Peak is hauled to the Helvetia mill, a mile or so distant. Both the High Peak and Helvetia mines and the mill are the property of Mr. Havermale of San Diego. The owner has every confidence in his mine, and is doing the development work in a miner-like fashion, as though he anticipated a long period of prosperity, and not a little boom of a day.

It is understood from persons who came down from Julian Saturday that Mr. Lane, one of the Pomona representatives of the Gold King company, is about to assume charge of the mines of the company.

The Pine valley district, where the rich strike was recently made, is situated about 20 miles southeast of Julian, and is said to be a very promising district. If very much \$2000 rock is found, it won't be very long before it will be pretty thoroughly investigated.

Are There No Silver Mines?

It may seem strange that so few silver mines are known or heard of in San Diego county. This fact is not positive evidence that there are no silver veins here. Those who inhabit the western portion of the county are essentially agriculturists and not a mining people; even near Julian about as much attention is given to farming as to mining. The fact is the miners in Southern California are gold prospectors and are not well posted in silver ore, and consequently fail to look for or notice "silver indications." There are no better searchers for gold prospects anywhere, but the drawbacks to silver prospecting are so numerous that but few mines of silver have been found in this county. There is little doubt there are good silver deposits back in the mountains, but they have never been prospected intelligently, if at all.

PUBLISHING MINING NEWS.—The Georgetown (Colo.) Courier, says: The reporter lives in a mining town. One of his pleasantest duties is to note the prosperous strikes of the miners when fortunate, and sympathize with them when they meet with ill luck. Of course all the mining news must be reported, and of course no individual miner must be mentioned. When the mining column is full, then the mine owner howls and wonders why in thunder that item was published. You are told that it is all wrong, but you can't get it right under any circumstances—because you can't get facts to make it right. And if the mining column has a few general items, its darn the newspapers anyway—there's nothing in them. Now mining news is the only general news that advertizes this county. If there is plenty of live, accurate mining news, it attracts capitalists. We can't grow wheat, we can't grow corn, but we are developing the best mines in the State. There is a lot of unprospected territory to be gone over, but it will never be touched so long as nothing is said about mining. It is a selfish principle to keep everything on the dead quiet. Men are glad to hear of other men's luck. It encourages them. It shows that something is going on. But ye patient reporter will have his revenge. He will give good, live, reliable mining items where he can. Where he cannot he will write his brainpan and say what ought to be if he can't say what really is. And ye mining men who get frothy at the mouth can go to the chief editor and tell the facts so the public will get at the truth at last. There are no flies on ye reporter at any season. There are no flies on some of ye mining men—because fly time has not yet come.

By the application of chloride of antimony a beautiful violet color is imparted to brass work. The brass should first be made perfectly clean and heated until water will steam off it without hissing.

SUGAR ON INCrustATION.—Recent experiments with sugar as a preventive for incrustations of steam boilers are reported as giving very satisfactory results.

Working, Rights of Way and Drainage of Mines.

The following law was passed at the recent session of the Legislature of this State:

SECTION 1. Whenever any mine owner, company or corporation shall have performed the labor and made the improvements required by law for the location and ownership of mining claims or lodes, such owner, company or corporation shall file or cause to be filed, within thirty days after the time limited for performing such labor or making such improvements, with the County Recorder of Deeds of the county in which the mine or claim is situated, an affidavit particularly describing the labor performed and improvements made, and the value thereof, which affidavit shall be prima facie evidence of the fact therein stated. Upon the failure of any claimant or mine-owner to comply with the conditions of this Act in the performance of labor, or making of improvements upon any claim, mine or mining ground, the claim or mine upon which such failure occurred shall be open to relocation in the same manner as if no location of the same had ever been made. But if, previous to relocation, the original locators, their heirs, assigns or legal representatives, resume work upon such claim, and continue the same with reasonable diligence until the required amount of labor has been performed or improvements made, and the required statement of accounts and affidavits filed with the County Recorder, then the claim shall not be subject to relocation because of previous failure to file accounts. Upon the failure of any one of the several co-owners to contribute his portion of the expenditures required hereby, the co-owners who have performed the labor or made the improvements may, at the expiration of the year, give such delinquent co-owner personal notice, in writing or by publication in the newspaper published nearest the claim, for at least once a week for ninety days; and if, at the expiration of ninety days after such notice in writing or publication, such delinquent shall fail or refuse to contribute his portion of the expenditures required by this section, his interest in the claim shall become the property of his co-owners who made the required expenditures. A true copy of such notice, together with an affidavit showing personal service or publication, as the case may be, of such notice, when filed or recorded with the Recorder of Deeds of the county in which such mining claim is situated, shall be evidence of the acquisition of title of such owners. Where a person or company has or may run a tunnel or cuts in good faith for the purpose of developing a lode, lodes or claims owned by said person or company, or corporation, the money so expended in running said tunnel shall be taken and considered as expended on said lodes or claims, provided further that said lode, claim or claims shall be distinctly marked on the surface as provided by law.

SEC. 2. All mining locations and mining claims shall be subject to a reservation of the right of way through or over any mining claims, ditches, roads, canals, cuts, tunnels and other easements for the purpose of working other mines, provided that any damage occasioned thereby shall be assessed and paid for in the manner provided by law for land taken for public use under the right of eminent domain.

SEC. 3. This Act shall take effect immediately.

THE FAHRUMP MINES.—The *Reno Journal* says C. R. Glass, formerly of the United States Surveyor General's Office here, arrived yesterday from the new mines in the southern part of Nye county. These mines were discovered early last winter by George Montgomery, who left San Andreas, California, with a party of five prospectors, fully equipped, to prospect southwestern Nevada and search for the mythical Breyfogle mine. In the northwest end of the Washington Mountains, which skirt one side of the Fahrump Valley, the party discovered gold-bearing quartz. They located several leads, some of which contain galena and silver-bearing ores, but all rich in gold. The ledges are from five to ten feet wide and the mineral belt in which the ledges are situated is at least six miles long and from one to two miles wide. A new district, named Montgomery in honor of the discoverer, has been organized, and when Mr. Glass left, there were about 100 men and one woman in the camp. Water is carried in canvass bags, and packed on donkeys' backs, four miles from the nearest springs. Nut pine timber, good for fuel, is abundant within four or five miles of the mines, and white pine, suitable for timber, abounds about 20 miles from Montgomery. The nearest postoffice is Ivanpah, California, 80 miles away, but a postoffice will be established at Montgomery in a few weeks. Much of the agricultural land in Fahrump Valley has been taken up by Californians under the land laws of Nevada, but there is plenty of timber land to be had at the Government price, \$1.25 per acre.

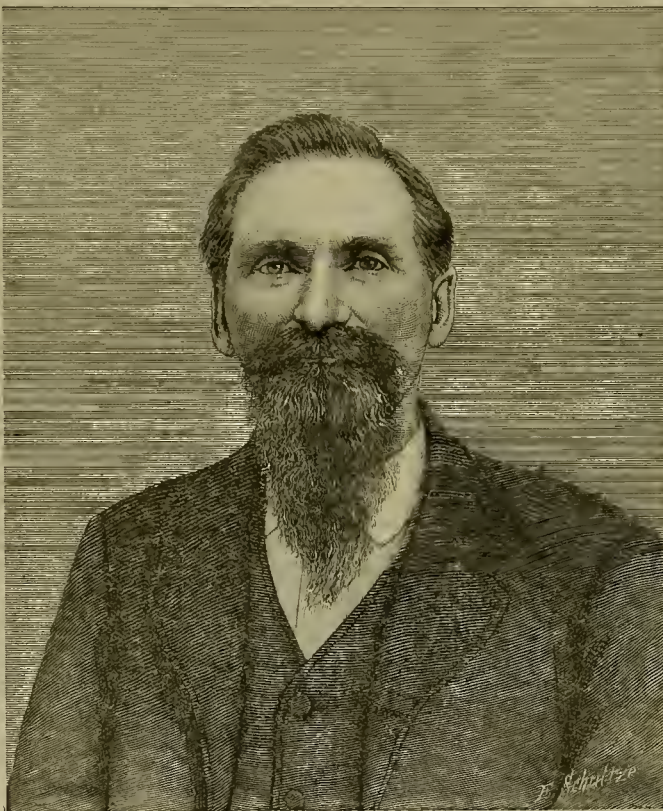
A PAYING GOLD MINE.—The gross yield and the dividends of the Idaho Mining Company have always been a subject of dispute, says the *Grass Valley Tidings*. Figures purporting to be correct have frequently been published. Reliable authority, however, places \$11,250,000 as the gross yield and \$4,350,000 as the aggregate of the dividends, and these figures are as nearly right as can be obtained without reference to the books and an exercise in addition. The dividends are 253 in number.

Daniel Best.

The necessity of labor-saving machinery, especially of agricultural implements, and also the opportunity for rich reward, has stimulated the best talent and brightest minds in devising and inventing implements and machinery suited to our condition and environment. Among the men who have ministered to this demand is the subject of this sketch, Mr. Daniel Best of San Leandro. He is a native of Ohio and a descendant from that noted ancestry that settled in Ohio and Kentucky with Daniel Boone. His occupation was a farmer. In 1859 he went to Portland, Oregon, and led a roving life, alternating as a prospector and laborer. At the age of 21, he commenced carrying slabs at a sawmill, and in less than six weeks he was foreman and manager. Shortly afterward he was the subject of a mining fever, and made a venture in the mining region of the Blue mountains of Idaho and Oregon.

He commenced manufacturing lumber with a whip saw, but soon devised a plan to build a sawmill out of the waste iron that had been scattered on the plains by emigrants. With a tool-chest containing one saw, broad-ax, square and augur, he succeeded in building a sawmill that could turn out 1200 feet of lumber per day. Mr. Best afterward ran a sawmill in Washington Territory, and while there met with a severe accident that induced him to come to California, settling in Sutter county.

He saw the necessity of portable cleaners for



DANIEL BEST, THE CALIFORNIA INVENTOR AND MANUFACTURER.

grain, and designed and invented one, a half-interest of which he sold for \$5000 to Mr. L. D. Brown, the joint interest of which was sold for \$32,000 afterward. He organized the Marysville Mining Co., and spent two years in Oregon up to 1876.

In September, 1885, he bought out the San Leandro Agricultural Works, Alameda county, and entered largely in the manufacture of agricultural implements, principally grain-cleaners and combined harvesters. During the last four years he has given a great deal of attention to the building and improving the Remington traction engine. With his improvement, for which letters patent have been granted him, he has succeeded in making the traction engine a necessity to our large ranchers and lumber-men. Of these traction engines there are now 28 in actual use, and in every competitive trial the Remington has been awarded first premium. His latest invention is a gas engine that has given unqualified satisfaction.

Mr. Best is a genial, modest and reliable citizen, prosperous in business, and enjoys a high reputation as a man of veracity and integrity. He has been blessed in his domestic relations, and at his hospitable home is surrounded by a most estimable wife, who has shared his fortune in adversity and prosperity, and six promising children. He is an honored member of the Ancient Order of United Workmen.

He is possessed of a high mechanical talent, and may be properly termed an inventive genius. The results that have followed his inventions and the success of his labor-saving machines and agricultural implements entitle him to rank with other great American inventors, such as Whitney, Singer and McCormick. Our artist has made a correct likeness of Mr. Best, whose name has become noted as the sagacious inventor and successful manufacturer of agricultural implements and traction engines.

A Proposed Mining Tunnel.

The Tintio (Utah) *Miner* says: While wandering around seeking stray items, the first of the week, we dropped into Christensen & Burch's office, and deliberately stole what we think to be an item that is to be of vast importance to Enreka and Tintio. Spread out upon the table before Mr. Christensen was a map and profile of the big tunnel to be run by California capitalists through the mountains southeast of Enreka. This tunnel is to start away east among the iron placers, and runs for a distance of about 5000 feet in the direction of a little west of South, passing close to the northern end line of the Spy and also the Slonx group; then it changes its course and runs a little more west of south for a distance something over 6000 feet. In this last course it passes through the northern part of the Mammoth and southern part of the Centennial-Enreka company's property, about 700 feet southerly from Enreka peak. In crossing the big Mammoth mountain, though it does not go under the summit, it has a depth of 1725 feet below datum line, and when it passes the Enreka peak, which is 1700 feet above the tunnel line, though it passes about 700 feet south of the same, it will have a depth of from 1150 to 1250 feet. The object of the company constructing this enterprise is to furnish an avenue, or more easy way for the numerous mines through which it passes, to get their products to the surface, and we understand

worked on sound business principles, as mining is an industry which is now getting to be thoroughly understood. We do not think there will be any more mining "booms" in the State, nor are they at all desirable, as they do nothing but enrich speculators, who happen to be on the inside.

RIVER MINING.—Work is to be resumed mining the river at Big Bend this summer. Last week, A. K. Beaton, the superintendent, received a dispatch from Dr. E. V. Pierce of Buffalo, the president of the company, instructing him to go on with the work. Mr. Beaton informed an Oroville *Mercury* reporter that there are two places in the river he intends to mine. One is near the head of the tunnel and the other farther down. He will use steam power for his derricks and pumps at the first claim, and the water he flumes from this will make power for the claim below. Mr. Beaton does not believe the tunnel will carry the waters of the stream until about the middle of July, but he says they can get ready to mine inside of two weeks and continue three months. Probably 50 men will be worked from the start. Our people will be glad to hear of this. They believe that there is gold, and lots of it, in the river at Big Bend, and if any one knows how and where to find it, it is Andy Beaton. The *Mercury* also says: Things are booming at the Golden Gate and Golden Feather mines. About 300 men are at work in the mines, and many others with teams are hauling lumber and other material. For over two miles the river seems to be alive with men, and the great enterprise in all its departments moves on with the precision of well-regulated machinery. The great oval wall of the Golden Feather is crawling to the southern limit of the mine, and pretty soon the river will be turned from its ancient channel and the accumulation of centuries will be investigated.

CORROSION OF IRON AND STEEL.—The philosophy of the corrosion of iron and steel, the best way to avoid it and the best manner to remove it, is just now exciting much interest among both iron workers and iron producers. At a recent meeting of the Engineers' Club of Philadelphia, Mr. Radolph Hering read a paper on the corrosion of iron and steel, and referred to galvanic action as a principal cause. He gave the results of experiments on this subject, and principally of those made by Mr. Thomas Andrews of England. Wrought iron was placed in connection with numerous steels and cast iron, and exposed to sea water for about 300 days. From these it was found that metals corroded much faster when in galvanic connection than otherwise. The wrought iron (Wortley best scrap) resisted corrosion better than either steel or cast iron. The electro-chemical position of the steel changed frequently with reference to wrought iron, indicating that corrosion took place alternately in the wrought iron and steel. The position was almost constant, however, when connecting wrought and cast iron, indicating corrosion to take place almost entirely in the latter. Gravimetric results were also given, which showed the amount of corrosion in grains per square foot, per annum, under the conditions assumed in the experiments.

STERILIZING WATER.—Water is easily sterilized by keeping it at or near the boiling point for 15 minutes. Five minutes' heat is sufficient to destroy all harmful micro-organisms. Still less time suffices to destroy the disease-producing varieties which are recognized as liable to occur in water. Thus, merely raising to the boiling point a clear water containing the micro-organisms of malarial disorders, typhoid, cholera, diphtheria, or of enteric processes, and allowing it to gradually cool, ensures the destruction of these germs. They are also destroyed by keeping the water for from a quarter of an hour to half an hour at a temperature of 170° Fahr. Occasionally, however, very resistant but harmless bacteria may get into water. The brief heating renders them safe for drinking purposes, but when it is desired to destroy every micro-organism that may be present in a contaminated water, it should be heated for one hour and allowed to cool slowly. It may then be used for cleansing wounds or for alkaloidal solutions, which will keep indefinitely if no germs be introduced after the solution has been heated.

GOLD DISCOVERY.—William Pryde arrived in Winnemucca yesterday and reports that there is great excitement at Willow Creek over the discovery of gold near L. L. Rickard's (Montana's) ranch, this side of Disaster Peak, in the northwestern part of the county, near the Oregon line. E. M. Samples arrived at the camp Friday with a sack full of rock which he had taken from the ledge near the ranch. The quartz was pounded up in a mortar and found to be fairly lousy with gold. Samples came in for tools and immediately returned to commence work on the claims which he had located. Gold has been found in this locality before, but all efforts to discover the ledge were futile. All the miners at Willow Creek have left for the scene of the discovery. *Silver State*, May 13.

SANDALWOOD IN LOUISIANA.—It is said that a grove of the finest quality of sandalwood, 300 acres in extent, has been discovered in Louisiana. The trees are of immense value, and a company is to be organized to prevent them from becoming extirpated.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SOLD BY THE SHERIFF.—Amador *Ledger*, May 16: Last Monday the sheriff sold under judgment of foreclosure the Amador Queen mines, Nos. 1 and 2, together with 25-stamp mill and millsite. The property is situated in Hunt's gulch, Jackson district, close to the 40-stamp mill belonging to the Amador gold mine. A. S. Cochran & Co., of London, England, who is the principal owner in the Amador gold mine, was the judgment creditor, having purchased the claim from the original mortgagees and leinholders. Mr. Eisner of the law firm of Lindsey & Eisner of S. F., the attorneys for the Amador gold mine, was present at the sale; also J. E. Dye, the financial agent of the corporation in this county. The entire property was bid in by Mr. Dye for A. S. Cochran & Co., for the sum of \$11,150, which is some \$700 short of the judgment and costs. The owners have six months in which to redeem.

BUNKER HILL.—The Bunker Hill reduction works have been idle for the past week, as they are being cleaned up and undergoing repair. The mortars at the mill are also being fitted up, with the intention of starting up 40 stamps.

PLYMOUTH.—The Bay State Mining Co.'s shareholders convened in Randolph's hall on the evening of the ninth, as per notice, and effected a temporary organization by the election of a board of directors to serve for three months. The following are the names of the directors and their places of residence: W. T. Jones, Plymouth; K. F. Crocker, Drytown; W. A. Green, Plymouth; T. Price, S. F.; Mr. Young, Placerville; J. F. Parks, Jackson; A. J. Crain, Plymouth. A. J. Costa was chosen as secretary, and L. G. Norris, treasurer. Mr. Randolph presided at the meeting with marked ability; his experience in organizing the Drytown Consolidated standing him in good hand. The general feeling over this way is that the Bay State will start up one of the best mining properties in the State.

ATTACHING A MINE.—Amador *Dispatch*, May 16: The Bunker Hill mine near Amador City has been attached by John Mitchell, to whom has been assigned the accounts of the employees of that mine, for the sum of \$9934.75. The cause leading to this action on the part of the miners, we understand, is the reported failure of a bank in Philadelphia to which the mine belongs. Messrs. Caminetti & McGee are the attorneys for the miners. We understand that other suits are also being commenced for further sums by other parties who have employed D. B. Spagnoli as attorney.

Butte.

FROM OROVILLE.—*Mercury*, May 15: Alvinza Hayward arrived in Oroville last night. He and Messrs. Belding and Vail went to Forestown today, where they will join C. J. Nickerson and arrange to open the Shakespeare mine. The advent of Mr. Hayward in the Butte county quartz mines is significant. He is recognized as one of the most expert quartz miners on the coast and is a man of experience and wealth. We hope soon to chronicle good news from the Shakespeare.

Calaveras.

GOOD PROSPECTS IN CALAVERAS CO.—*Prospect*, May 16: Rumor has mapped out a large program of work for the coming months and if a fair percentage is inaugurated, ours will become a stirring section. First it is said that the great Union Water ditch will be enlarged so as to convey a vast amount of water, more than ever before, and that several hundred men will be required to push the work through this summer. Then in addition to this, it is supposed that the Vallecito Gold Mining Co. will begin the construction of their ditch to take its water from the Stanislaus river, and run thence to Vallecito where it will be judiciously handled in working the rich gold deposits of that place. Again the opinion is that the dam at Silver Valley above Blood's will require a large force of men in its construction this summer. This will be another great feature in the water facilities that are becoming perfected in this end of Calaveras. Before many years it can be strenuously argued that water is taking the lead here, and whiskey for once will have resigned itself to second place. Mining matters are looking up in this district; Condit & Co. have gone to Stanislaus to resume work upon the Pierce mine. C. Campbell is having a quantity of ore crushed from the Woods mine at Indian creek at his mill here and from all evidence the rock is going to run up to a high figure per ton. This crushing will be a test and it is presumed it satisfactory will mean more permanent and active mining operations on that piece of property. Buckminster's gravel mine at Douglas is steady in operations with a night shift and a day shift and tons of gravel are daily going through the flumes. The Norfolk mill and mine are constantly going on in regularity of labor, and though the yield is not publicly known, supposition is that the mine is above the average.

El Dorado.

PLACER MINING.—El Dorado *Republican*, May 14: C. A. Swisher and W. W. Stone have struck a good claim in Long Canyon, above Blair's sawmill. Lou Gignac and another man are at work ground sluicing in the claim and are finding some rich dirt. Lou was in town Tuesday and exhibited the result of three pans which aggregated about \$8 of rather coarse, bright, channel gold, one piece weighing over a dollar.

Nevada.

MINING INCORPORATION.—Grass Valley *Union*, May 13: The Gaston Ridge M. & M. Co. of San Francisco, to operate near Graniteville, in Nevada county, has filed articles of incorporation in the Secretary of State's office. The capital stock is \$1,000,000 and the directors Patrick Foley, Michael Bohannan, F. M. Cartan, T. F. McCarthy and J. F. Nugent.

OMAHA MINE.—The strong flow of water in the No. 10 drift, north of the Omaha mine, which was so troublesome several weeks ago, has greatly reduced in volume and the work of sinking the main incline shaft, which was interrupted, has been resumed.

THE MANZANITA.—*Transcript*, May 13: The local company recently organized to proceed with

the developments of the Manzanita drift mine at this city will begin the present week to grade for the hoisting and pumping works [that are to be constructed. The machinery will be operated by water from the company's own ditch. There is to be an incline on a grade of two feet in twelve, and having a perpendicular depth of 42 feet, which will reach the level of the channel. There will be a double track and an endless cable which will hoist the loaded cars and lower the empty ones. All the arrangements will be made with a view to cheap and rapid operation.

TAKING OUT MONEY.—Grass Valley *Union*, May 15: The miners of Cherokee, Butte county, are represented to be taking out \$3000 a month in a small way, by means of rockers and sluices.

HERMOSA MINE.—Preparations are nearly complete for resuming work in the Hermosa mine, and it only needs the putting in of a new sweep rod and the placing of a pump column to commence the pumping out of the shaft. The shaft is 180 feet in depth and there are only 80 feet of drifts to drain so the relieving of the shaft from water will be the work of but a few days. The mine has been idle since it was drowned out by water, winter before last, but heavier machinery has been put in the works and there will be no difficulty in handling the water in the future. The mine is not a wet one and the 8-inch pump that is being put in will handle the water easily. There is a two-foot ledge in the bottom of the shaft that looks well and is expected to give good mill results. The Hermosa location is 400 feet in length, extending from a point west of Watt Park to the head of Scadden Flat. The number of shares in the company is 30,000, all of which have been disposed of. The mine is regarded as a good prospect.

WHITE PINE MOUNTAIN.—Grass Valley *Union*, May 14: The mines of White Pine mountain have about 600 tons of lead ores for shipment to Salt Lake. The ores of White Pine are heavier in lead than those of any other section in the West.

DIVIDEND NO. 3.—*Foothill Tidings*, May 15: Dividend No. 3 of five cents a share, aggregating \$1500, was declared by the directors of the W. Y. O. D. mining company Saturday evening. The company has paid for the 10-stamp mill purchased recently and has a substantial treasury at its command, dividend No. 3 notwithstanding. The new mill is in course of erection, and with other improvements will cost \$15,000. Of these improvements a new boiler and engine, now in place, are not the least, as the hoisting and pumping plant as at present existing is of such capacity as to enable operations to a depth of 1600 feet. The shaft is now 800 feet in depth, and there is enough ore in sight to keep the new mill busy for a year. Of course, the increased milling facilities will permit the payment of larger dividends. Returns from a number of tons of sulphurets sent to the Selby Smelting Works by the W. Y. O. D. company are very gratifying, the gross yield being \$300 per ton and the net returns \$250 per ton.

NEW EUREKA TEST CRUSHING.—The New Eureka mine company's lease of the Crown Point mill has expired and the stamps are now at work on quartz from Williams & Co.'s claim on Slate creek. The test of the New Eureka ore, we are unofficially informed, revealed that it is of a low but nevertheless profitable grade, coming as it does from a large ledge and being cheaply extracted. The sulphurets, which are known to be high-grade, were not saved because of an accident to the concentrators.

STOCKHOLDERS MEETING.—The annual meeting of the stockholders of the Maryland Gold Mining Company was held Monday evening and the old Board of Directors and officers re-elected. These are: Wm. Young (of San Francisco), Rufus Shoemaker, S. P. Dorsey (Pres. and Supt.), C. H. Mitchell and Louis V. Dorsey (Sec'y and Treas.). No other business was transacted. Mr. Young, who is a former townsman, was present. He returned to San Francisco to-day.

Sierra.

VARIOUS ITEMS.—*Mt. Messenger*, May 16: Work at the Thistle shaft, near Gibsonville, is progressing satisfactorily, under the direction of F. A. Gourley. The tunnel is now 300 feet from the bottom of the shaft, across the channel. The bedrock pitched away from them before they got very far from the shaft, showing that the bottom of the channel had not been reached. The tunnel is all in gravel, and will be continued until the rim is reached, when a shaft will be sunk in the center. When once the lowest point has been found, work on the tunnel will be begun. We are informed that all the works will be in Sierra county. From a few loads of gravel the extension cleaned up \$70 last week. One piece was worth \$25. The Wide Awake Co.'s main tunnel was half in gravel the first of this week. Mr. Snap, a prospector, was in town the first of the week. J. Moulton and James McGregor expect to prospect their quartz ledge near Chip's Flat next week. Fred Morris, of the Tecumseh quartz mine, Logansville, is expected up in a few days with his family, to begin work on the mine. The snow is disappearing very fast. The Quincy stage goes clear through to La Porte now, with a sleigh, and Gus Berg, the driver, says if the weather continues to be pleasant that within 10 days he will be able to come from La Porte to Gibsonville with a wagon.

Trinity.

STRUCK IT.—*Journal*, May 16: W. F. Arnold was in from East Fork Wednesday and informs us that he struck the ledge the day before in the Thanksgiving mine, owned by Mr. Henry Junkans of this place. The ledge is from 18 to 20 inches in width, looks first rate and prospects very well. Reports from all parts of the county represent the business of mining, both quartz and placer, as being in an active and prosperous condition. The hydraulic miners have plenty of water and as they are making the best use of it, the season will prove with them an unusually good one.

Tuolumne.

ANOTHER STRIKE.—*Tuolumne Independent*, May 16: Last week a strike was made in one of the Pedro pocket claims on Brown's Flat, and worked by Messrs. E. J. Richards and Chas. Rudoff. About \$200 was taken out. We learn that Mr. James Stone and partner have been getting flattering prospects in their mine on Brown's Flat recently, with every indication of a good pocket in the near future. We hope it will prove true and that the gentlemen will reap a golden harvest that will make their hearts light and their pockets heavy.

NOTES FROM GROVELAND.—Sonora *Democrat*,

May 16: J. Quimby is busy at Sequoia crushing quartz from his mine, in an arrastra mill. The rock goes from \$25 to \$100 per ton. Santa Maria may prove quite a prosperous camp again if this mine keeps up its licks. Work of exploration is to be commenced this week on a very promising vein near John Smith's on the Yosemite road.

NEVADA

Washoe District.

THE WEEK'S DOINGS.—*Enterprise*, May 16: It is reported that a body of ore has been struck on the 1405 level of Ophir at a point about 90 feet north of the Con. Cal. & Va. line. If this strike of ore should prove to be the northern continuation of the ore development of Con. Cal. & Va. on the 1500 level, northeast of Con. Cal. & Va. shaft its importance would be difficult to estimate, but it would account in a measure for the recent rally in prices of stocks. With reference to the rumored strike in Ophir, Supt. D. B. Lyman last evening explained to an *Enterprise* reporter that on the 1405 level of Ophir toward the south end of the mine he was exploring a splendid body of quartz—at least 100 feet thick—and that he was cutting stringers of fair-grade ore occasionally. There is some hope entertained that it will make into a good ore body yet. The Alpha hoisting works are again in operation. The Washoe mill, of ten stamps, has started up on Justice ore. The Alta mill is now running five stamps, which will soon probably be increased to the full capacity of the mill—15 stamps. It was stated on the street yesterday, explanatory of the recent break in Con. Cal. & Va., that a clay slip had been encountered in the south drift on the 1100 level, but that the drift had passed through it and again penetrated the same kind of ore. This was given on account of the sudden break and equally sudden recuperation of the stock. Such a clay slip, running through a strong body of ore, would be an exceedingly strange occurrence, and the *Enterprise* does not believe a word of it. The slip, if it existed anywhere, ran across Pine street in San Francisco, and it was never visible at this end of the line. The heavy inflow of water in the Crown Point incline above the 1700 level has been conquered, the submerged Dow pump has been retrieved, and the work of draining the Gold Hill mines is again going on as usual. The following information has been gathered from the weekly letters of the superintendents:

ALTA.—The mill is now working five stamps on ore extracted from stopes throughout the mine.

YELLOW JACKET.—Are doing the usual amount of prospecting work, and preparing to open out on the 1200 to the 1300 level, preparatory to the extraction of gold bearing rock to be crushed at the Santiago mill.

CROWN POINT.—The north drift from the 300 stope, 11th level, is now out a total distance of 33 feet. It has passed through and the face is still in low-grade quartz. The 1000 level east crosscut from the main south drift is out a total distance of 78 feet, having been extended 21 feet during the week; the face is in porphyry, with streaks of low-grade quartz through it.

Justice, Kentuck, Con Imperial, Challenge, and Belcher are doing the usual amount of exploratory work.

SEG. BELCHER.—On the 600 level the west crosscut from the south lateral drift has been advanced 12 feet since last report, and is now out a total distance of 38 feet; the face is in a mixture of porphyry and clay. A portion of the week has been occupied in timbering the main drift.

SAVAGE.—We have hoisted 552 cars of ore from the 500, 750, 800, 900, 950 and 1000 levels. Shipped to the Mexican mill 557 tons and milled 669 tons; average battery assay, \$17.20. We have bulion on hand amounting to \$10,072.41. We have repaired and retimbered the E-street tunnel a distance of 500 feet. On the 800 level the winze started 80 feet north from our south boundary is down 24 feet in ore. At this point we have commenced stoping; it shows a width of 16 feet of fair-grade ore. On the 950 level the upraise near our south boundary is advanced 32 feet, top is in porphyry and stringers of ore. On the 1100 level the east crosscut from face of north drift was advanced 45 feet to the east clay wall. Opposite this we have started a crosscut west, which is advanced to feet in quartz giving low assays. From the east intermediate drift below the 1300 level the winze has been carried down the 85 feet and connected with the north drift on the 1400 level. The north drift, 1400 level, was advanced 23 feet; about half the face of this drift is in ore of good quality.

HALE & NORCROSS.—The winze from No. 3 east crosscut, 1400 level, is down 80 feet; the bottom is in quartz. No. 5 joint east crosscut on the south boundary has been extended a total distance of 105 feet to the east boundary of the vein. The main incline is now repaired 195 feet below the 1400 level, and have started to open the 1500.

SILVER HILL.—Southwest drift, 50-foot level, is out from shaft 20 feet; face in hard porphyry and clay. South crosscut, 160 level, is out from winze 520 feet; face in hard porphyry.

ALPHA AND EXCHEQUER.—Have completed repairs to shaft and resumed work in the mine.

SIERRA NEVADA.—630 level: West crosscut No. 1 from the northwest drift, 571 feet from the shaft, has been advanced 36 feet; total length, 382 feet. The formation is somewhat softer.

NEW YORK.—North lateral drift, 600 level, is out north of shaft 198 feet; face in porphyry. North lateral drift 1100 level, is out north of shaft 481 feet; face in quartz yielding low assays.

CHOLLAR.—The south drift, 1400 level, from the north 1st, is out 100 feet; face in porphyry. We are cutting out a winze station in the joint east crosscut on the north line, 1400 level. Extracted and sent to the mill the past week 545 tons of ore of the value of \$19.94 a ton, as per battery samples.

POTOSI.—The winze is down 4 feet below the 1400 level; the bottom is in porphyry and streaks of quartz. The south lateral drift from the winze station, 1300 level, is out 204 feet; face in quartz and porphyry. South lateral drift from the Chollar incline, 1100 level, is out 154 feet; face in clay and porphyry.

WARD COMBINATION SHAFT.—The only work done the past week has been confined to repairs to the 1800 level station.

UNION SHAFT.—West drift from the shaft, 900 level, is out 150 feet, making 46 feet during the week; the face is in hard porphyry.

OCCIDENTAL.—Extracting fair-grade ore from the 350, 400 and 450 levels. North drift from No. 1 upraise, 500 level, is in 92 feet; face in low-grade quartz. South drift from the same point is in 79 feet; face in low-grade ore. South drift from No. 1 winze, 600 level, is in 105 feet, face showing ore of average value—\$22 a ton. North drift from No. 2 winze, 550 level, is in 342 feet; face in low-grade quartz. South drift from No. 1 winze, 750 level, is in 81 feet; face in low-grade quartz.

UTAH.—Incline winze has been sunk 18 feet; total depth, 40 feet; the bottom of the winze is showing porphyry, clay and quartz, assaying low in the precious metals.

ANDES.—On the 420 level, east crosscut from south drift has been advanced 20 feet during the past week; formation, vein porphyry. East crosscut from the north drift on the 420 level was timbered and advanced 15 feet; face in quartz.

Candelaria District.

A DEEP MINE.—*Silver State*, May 15: The Holmes Mining Co. is now extracting ore from the 2100 foot level of the Northern Belle mine at Candelaria and obtaining a rare kind of silver ore that is pure turquoise in color and quite rich. The mine at that depth continues, as it has from the surface, to be as dry as a powder horn, and there has never been a drop of water encountered in it.

Tuscarora District.

NEVADA QUEEN.—*Times-Review*, May 15: South drift from east crosscut on 4th level Commonwealth extended 20 feet in vein matter.

NAVAYO.—The stopes above the 350-foot level continue to produce their usual quantity of ore. The water is not so strong.

DEL MONTE.—West crosscut, 3d level, advanced seven feet. Cutting out for chute and putting in timbers interfered with progress in the crosscut. Joint raise has been put up 20 feet.

BELLE ISLE.—The prospecting winze from the intermediate crosscut from No. 1 chute, 350-foot level, extended 5 feet; total 20 feet. The rich ore is getting wider.

COMMONWEALTH.—First level: Have retimbered on north side of shaft and extracted 18 cars of first-class ore, assay, \$203 per ton; also 39 cars of ore, average assay \$42 per ton. Fourth level: North drift has been advanced 20 feet and timbered. The whole face of drift in low-grade ore and shows a marked improvement as the drift is advanced. East crosscut extended 20 feet.

NORTH BELLE ISLE.—South drift from east crosscut, 400-foot level, extended 20 feet, the face still showing good ore. The stopes started over this drift are looking very well. Broke five cars of first-class and 81 cars of second-class ore. The stopes from the intermediate from No. 4 chute, 600 level, are looking about the same.

NORTH COMMONWEALTH.—First level: The stopes show more ore, getting wider but not so high grade. There have been crushed at Union mill 270 tons of ore; assay from battery pulp, \$27.60 per ton. Crude hullion on hand, \$23,000. Concentrating plant started Monday. Crushed 200 tons of ore, average assay, \$27 per ton.

ARIZONA.

THE BLACK BEAR.—*Silver Belt*, May 9: Mr. O. B. Hardy, owner of the Black Bear mine located in the Coeur d'Alene Idaho, has closed a deal with Mr. W. McCaskey, of the Edison General Illuminating & Power Co. of New York for the construction of ten electric drills, which will take the place of compressed air drills in his mine. The amount expended for this purpose has been about \$8,000. "The company," said Mr. Hardy, "goes at it in such a manner that I have extreme confidence in the value of the machinery. They ship all the machinery, pay all the expenses and run the drills 40 days before I turn over a cent. The Yavapai Mining and Storage Co. is doing a good business in their placer claims at Camp Hattersley and French creek. At Hattersley a hydraulic apparatus is in successful operation, and a large quantity of gold is being taken out daily. The company work 50 men at both camps and thus far the claims have proven very satisfactory. Hydraulic works will soon be in operation at French creek, when the results will be much more satisfactory.

BLOWN UP.—*Tomahstone Prospector*, May 12: Jake Bowman came over from Bisbee this morning and brings the report of an accident in the Copper Queen mine last night in which John Torpey and W. Nelson were horribly mangled by a blast. It seems that they had put in five holes and lit the fuse of all but one which kept them longer than anticipated but they thought of no danger until the first hole went off and blew them headlong into the drift. One of their companions happened to be near by and procured assistance and took them to the surface, where willing hands conveyed their bleeding bodies to the hospital. Faint hopes are entertained of their recovery.

NOTES.—*Prescott Courier*, May 13: Miners of Big Bug district tell us that Superintendent Clark is having good substantial work done in the Silver Belt mine. His Honor, Mayor Howard has a force of men working in a Groom Creek district mine. Twenty thousand pounds of very high-grade silver ore were recently shipped to El Paso by Tip Top district miners. Superintendent Murphy has gone to Congress to start the mill. United Verde is shipping carloads of copper-silver hullion. Mr. Lawler, of the Hillside mine, has teams on the road, hauling very rich silver ore. Work is progressing favorably in Phelps, Dodge & Co.'s camps—Copper Basin, Senator and Big Bug.

MINING NOTES.—*Courier*, May 21: Miners of Big Bug district tell us that Supt. Clark is having good substantial work done in the Silver Belt mine. Mayor Howard has a force of men working in the Groom Creek district mine. Twenty thousand lbs. of high-grade silver ore were recently shipped to El Paso by Tip Top district miners. Supt. Murphy has gone to Congress to start the mill. United Verde is shipping carloads of copper-silver hullion. Mr. Lawler, of the Hillside mine, has teams on the road, hauling very rich silver ore. Work is progressing very favorably in Phelps, Dodge & Co.'s camps, Copper Basin, Senator and Big Bug.

BRITISH COLUMBIA.

HOT SPRINGS.—*Nelson Miner*, May 16: On Tuesday there arrived at Nelson on their way to Ainsworth, a party of Montana men who are largely

interested in Hot Springs district. The members of the party were A. W. McCune, F. E. Sargent, William Thornton and Scott McDonald. They were met at Nelson by Henry Giegerich and A. D. Wheeler. Mr. McCune, as a partner with Messrs. Giegerich and Wheeler, has been interested in the district since its discovery. Mr. Sargent is secretary of the Anaconda Co., and comes in along with Mr. Thornton, who is cashier of the first National bank of Anaconda, to talk over the interests recently sold by A. D. Wheeler to W. L. Hoge. Mr. McDonald is a mine manager in the Cœur d'Alene country. Mr. Hoge, who purchased Mr. Wheeler's interest in the Skyline, Krao, Crow Fledgling, Blackbird, Maestro, Banker, Pataha, Attended, Bugaboo, Libby, and two or three side locations, is president of the First National Bank of Anaconda, and is associated in business with Marcus Daly, manager of the great Anaconda mines and smelting works. The mere fact that he has secured interests in Hot Springs district, should give claim owners confidence, for he is not a man likely to purchase worthless mining properties. As soon as a boiler of larger capacity can be got to the ground, the work of sinking will be resumed on the Skyline. Work will also be commenced on the Krao.

ANOTHER GOLD MILL.—The new trail to the Whitewater mine on Rover creek will be finished on Tuesday. The mill on the Gold King has been taken down, and will be packed to the Whitewater ground next week. A triumph vanner was received at Sproat on Monday. Work will commence on the mill building on Tuesday, and manager Davys expects to have the mill running the first week in June.

COLORADO.

LITTLE ANNIE.—*Aspen Times*, May 12: Last fall the Little Annie Mining Company at great expense, aided a little by a few business men of Aspen, built a good wagon-road from the Castle creek road to Richmond hill. This road is open for the free use of all who desire to travel it. Now that the snow is off, the county should put its main road in repair and declare the Little Annie road a county road and repair it. The county will be ready and certain to receive its taxes on ore output and improvements of that section, and it would be no more than justice to tax-payers if a little money was appropriated by the county commissioners in this direction. A cave was struck in the north drift of the second level of the Little Annie mine last evening which seems to be a pot of mineral. It will be explored to-day. The company is now advertising for bids to haul the output of the mine to Aspen. Regular shipments to begin on the 20th. The entire ore body pays to ship without sorting. Three grades of ore will be made hereafter. The third grade will be stored at the mine for future treatment by low-grade processes. The mine is proving up more ore every day, and the big ore body found in the north first level is now being reached as is evidenced by the cave encountered yesterday. Parties who bought stock at 15, 20, 25 and 30 cents, and are trying to sell it at 27, will soon learn that the Annie is one of the best investments on the boards in Aspen.

THE PONTIAC.—A great change occurred yesterday in the drift running south in the Pontiac and Manager Brown thinks he will be able to announce a strike in a short time. The work will begin from the Iowa shaft in a day or so.

SAN JUAN.—*Aspen Times*, May 20: The prospects for an active mining season in San Juan Co. this year are all that could be desired. Notwithstanding the heavy snowfall in the latter part of the winter there is no more snow in the mountains than is usual at this time of the year, and that is going fast, as is evidenced by the booming creeks and rivers. Trails are being opened to the mines, and pack trains are beginning to come in from their winter ranges. The mines under development during the snow months all show the immense benefit that has been derived, and great reserves of rich ores have been opened up, which will in a few weeks be sending forth a silver stream that will permeate the business marts of our city and make our gulches teem with busy life.

NOLAN'S CAMP.—The latest from Nolan's camp is to the effect that 25 men are steadily employed in building a good road from the camp to Agüla, the station on the Denver & Rio Grande road, and a mill is getting into shape to go in there at once. On the mines a great deal of development work is going forward, and on all sides the indications are that a good paying camp will be the result of all this work.

IOWA GULCH MINES.—As a result of a great amount of development, the portion of Iowa gulch mining section running along the lower slope of Long and Derry hills, on the north, a considerable amount of ore was found there last season, but the chances are that this season's work will, however, discount last year's, and that at least two if not four mines will be added to our list. Among the best developed during 1890 at that point was the Frank, in which, at a comparatively shallow depth, some fine lead ore was found, and the data furnished by that work induced the owners of contiguous properties to start up. The strike or trend of the ore chute, being known, a shaft on the C. M. was sunk, in which some good ore was found, though it was thought that the workings were not deep enough, and the shaft is now being carried down.

DAKOTA.

ANOTHER PROCESS.—*Deadwood Pioneer*, May 19: The Colorado Gold & Silver Extraction Co. of this city, which uses the McArthur-Forrest, or cyanide process started its trial or test mill the past week. The process consists in crushing the ore so it will pass through a 40-mesh screen, when the ore is treated raw with a 1 per cent solution of cyanide of potassium, which is expected to dissolve the gold and silver, which is precipitated from the solution on metallic zinc. The new mill has ten stamps, 900 lbs weight which drop six inches 100 times per minute. The usual system of using different sized screens, passing the coarse ore back to the stamps for second crushing is used. All the ore before passing to the tanks will pass through a 40-mesh screen, but what portion of it will pass through finer screens is not known. The crushing of course is dry. From the stamps it is conveyed to cars where it is weighed and charged into the agitators, which are wooden revolving barrels 4½x8 feet. The charge for each barrel is 2½ tons of ore and 1½

tons of water, 1 per cent of which is cyanide of potassium. Both ore and water are accurately weighed. The interior of the barrel has longitudinal flanges which assist in mixing the pulp and water. The barrels are kept revolving for from six to ten hours, when the gold and silver are expected to be in solution. From the barrel the charge is dropped into circular tanks containing a false bottom four or five inches above the true bottom. The false bottom is covered with canvas, through which the liquid is filtered. The filtering is done from below by exhaust suction. The liquor is then pumped into vats from which it is slowly allowed to pass through zinc shavings, on which the gold and silver are precipitated. The liquor is then somewhat weakened and is restored to its 1 per cent cyanide strength, when it is ready for use again. Once washing the pulp is said to remove the last trace of cyanogen with its gold contents. The mill is fitted with two agitators and all needed tanks, and has a capacity of 10 to 12 tons per day. The consumption of cyanide is from two to three pounds per ton of ore treated. In a mill of 20 tons daily capacity, with wood at \$5 per cord and labor at \$2.50 to \$3 per day, the cost of treating ore should not exceed \$5 per ton.

JIM CREEK MINES.—Development work is being done on a great many claims and recent discoveries are very encouraging. Considerable work is being done on the Alliance, and the owner, Dr. Terry, is well satisfied with his prospects, as he has found a ledge of galena and carbonate ore. This property is supposed to be on the same belt as the Caliboga, Silver Reef and Jupiter lodes. On the Honduras some work has been done, and the outlook is good, as the same character of ore is found as on the Caliboga and others. This property is owned by Jack Wilson and Jack Forsythe. Jack McLaughlin arrived from the camp in Prosperity gulch, where himself and F. Thompson have been prospecting, and he exhibited some fine specimens taken from the Extension lode, an extension of the Alliance.

A FALSE REPORT.—The Sioux City Journal says that a letter received to-day from W. N. Nason, secretary of the Omaha Board of Trade, denies in toto the story started by the *Chicago Tribune* that the two committees sent out by the Omaha Board of Trade last year reported unfavorably on the Black Hills tin mines. Instead they made very favorable reports in writing and the matter will be brought up at the next meeting of the directors of the Board. Mr. Nason says it is incomprehensible to him how the story that the committee reported unfavorably was started.

IDAHO.

STORMY HILL.—*Idaho Avalanche*, May 9: On the Stormy Hill mine drifts are now being run both north and south at 260 feet from the surface. Only a few men have room to work at present, consequently the amount of ore taken out is not large. As soon as room is made, stops will be started. The ore taken out, it is thought, will mill about \$40 per ton. Some very rare and beautiful crystals are now being taken out of the lower drift in the Trade-Dollar mine. They are streaks of mica from one to three inches long, half an inch or more in diameter, a beautiful emerald green in color, and translucent. They are attached to quartz crystals found in crevices in the ledge. We have not found any miner who had ever seen similar mica formation elsewhere. A rich strike has been made a mile north of Spring City, Nev. This is a lode that parties have been trying to find for quite a number of years, as rich float has been found on several occasions upon the hillside by different parties. The Silver State is of the opinion that this find will be apt to create another boom for Spring City, and will be an encouragement for the new company that has but recently come into possession of the Paradise mines to push their reduction works to completion.

LOWER CALIFORNIA.

MINERALS IN SONORA.—*Lower Californian*, May 14: U. S. Consul Willard of Guaymas reports to his Government as follows, regarding mining matters in Sonora: The quantity of mineral ores exported during the past year from this consular district is more or less the same as the preceding one. Those from the north and central part were sent to the reduction works in the United States; those from the south (Alamos) go generally to the port of Mazatlan, Sinaloa, and are there reshipped to Europe or the United States by vessels. The concession granted by the State Government to certain American citizens to erect smelting and reduction works has not been complied with, and Sonora to-day has no smelting and reduction works where gold and silver ores are purchased and reduced, or where small mine-owners can have their ores treated. The only class of mines worked are those of silver and gold, but principally the former. Veins of copper, lead, iron, antimony, and deposits of cinnabar and coal are found in different parts of the district, but are not developed. The coal deposits have been worked to a small extent to supply fuel for the steam works of the mining companies in the immediate neighborhood. This coal, anthracite, is said to be abundant and of good quality, containing from 80 to 90 per cent carbon. The veins or seams vary in thickness from 4 to 10 feet. These deposits can be reached from the coast over easy grades.

MONTANA.

NOTES.—*Inter-Mountain*, May 11: The suggestion of the *Miner* that the city government provide for the employment of as many men as possible by beginning the work of paving the streets, is a most excellent one. The cost to the tax-payers will be no greater now than later, while the benefit to the labor and business interests would be far-reaching and immediate. There are 1500 idle miners here while the Anaconda is closed down. They are good citizens, most of them are married men and all of them are highly skilled. The camp cannot afford to lose them and they will remain here if temporary occupation can be provided for them. The mining estates and territories should be on the alert touching the question of Mexican lead ores. While western representatives and senators are resting in fancied security the owners of Mexican lead mines are exerting themselves to the utmost to evade the provisions of the lead clause in the McKinley bill and on some technical grounds have actually procured a

partial suspension of the regulation affecting lead in silver ores. Congressman Dixon is no doubt personally opposed to a tariff on lead or anything else, yet it is hoped that on behalf of our lead mine owners he will bestir himself in the matter and at least lay before the authorities the statements of the Montana lead ore producers.

TOSTEN SMELTERS.—*Mining Journal*, May 13: The smelter at Tosten, which has been closed some time, will be fired next week, arrangements having been made for a continuous supply of ore. The managers claim to have fully demonstrated the utility and practical success of their process; in this it is to be hoped that they are not deceived, as the treatment of ores under the process can be more economically accomplished than under any of the methods now in use.

NEW STRIKE.—*Mining Journal*, May 13: From a private letter, dated the 7th inst., the *Journal* has been privileged to make the following extracts: The excitement is pretty high here over the recent strike of native silver in the 500-foot level of the Cumberland. The company was making a raise up to the 305-foot level and struck on the footwall twin to four feet of very fine ore with native silver all through it. The smelter will start by the 18th or 20th inst. The Yellowstone is looking finely and good reports come from most of the properties being worked. There is considerable talk of a custom smelter being built at once. Castle's position as a great mining camp is assured beyond question, and it ought to be connected with Helena by a direct railroad.

TREASURE HILL MINING CO.—*Montana Mining Journal*, May 13: A description of this property recently appeared in the *Journal*. It consists of a group of four claims, the main lode having been opened along its length over 1800 feet, at every point disclosing the fissure carrying high-grade ore. Work is now progressing from the 100-foot level, which will be sunk an additional 50 feet, at which point levels will be run in each direction. No property in this camp gives a more favorable promise of becoming a great mine than does this. Crow creek is reached. Up its right bank Eureka and Eagle gulches lie, in both of which discoveries have been made and prospectors are busily engaged penetrating Nature's secrets. Beyond Crow Creek, Cedar Plain, Johnny's Gulch, Nigger Ridge, Ruby and other districts have been developed from which ore is being shipped. The districts covered have during the past winter been constant ore shippers, the ores from Indian creek going to Bedford, from Ben Kumber and Little Bonanza to Vose siding, and from the H. H. and East Pacific to Ryan siding. All this development has been accomplished in three years, and this season will witness more advancement than has been made altogether heretofore and the prediction is here made that by Dec. 1, 1891, the daily output will not be less than 100 tons. The credit of this work district is entirely due to the tireless prospector and men of small means, almost without exception Helena men, and to them shall be given the credit and to them will come the profit.

NEW MEXICO.

CARETA MINE.—*Southwest Sentinel*, May 12: J. Douglas Smith and J. W. Stone, owners of the Careta mine, at Bald mountain, have just received the returns from their last shipment of ore sent to El Paso; it ran 135.3 ounces in silver, 7 ounces in gold and 5 per cent in lead. The same owners have quite a quantity of ore sacked up on the Mayflower mine that will market about \$150 a ton, and a large quantity of low-grade ore that will run about \$40 to the ton, which they are holding over for the Flager mill to start up.

OREGON.

MINING ITEMS.—*Times*, May 15: T. P. Judson of Grant's Pass has bonded the Swacker quartz mine in Foots creek district and has put a mill on it, which is kept busy crushing ore. Considerable prospecting must be going on in southern Oregon, as a large number of location notices and mining guides are being purchased at the *Times* office. J. A. Harvey of Foots creek has discovered a well-defined quartz ledge which prospects very well. He crushed some of the ore and realized \$5 from a single pan. The extensive mines of Simmons, Cameron & Co., after several years of preliminary preparation, are now being operated on full time. A good season is expected there. The Sterling M. Co. has a good supply of water and two pipes at work. It is expected a good cleanup will be made at the end of the season, which is several months hence. The Wimer mines will probably be operated for several months this season, as the Circuit Court has dismissed the receiver, which action will probably allow Wadleigh and Co. to take possession again and work the property. Zach Cameron of Uniontown, who is interested in the Simmons-Cameron mine near Waldo, made them a visit this week.

UTAH.

DEEP CREEK.—*Park Record*, May 9: Boom, boom, and Deep creek grows deeper, the desert gulches narrower and water more abundant. If a concerted newspaper howl about Deep creek will build the new railroad and pull the Salt Lake real estate men out of the hole, something will have to be accomplished. If it fails, smash goes the inflated realty bubble, and mourning will be the order of the day in Zion. Something must be done, you know, or many will be buried.

A NEW DISTRICT.—*Park Record*, May 9: Mr. J. J. Daly was out from Salt Lake this week and during his stay in town made a brief visit to the *Record* office. From him it is learned that the Daly West group will be actively developed during the coming summer. A new and extensive hoisting plant will be erected and a fine working shaft put down. The Daly West ground lies between the old Daly group and the Anchor, and as the vein shows up strong at both ends of the property there can be but one result in developing it, and that is a big mine. The ground is owned by Mr. Daly and R. C. Chambers, both thorough mining men and possessed of ample means to prospect the property in a thorough manner. The group embraces some 3000 feet on the vein, and when opened up to working advantage will employ a force of some 200 men. Thus the resources of Park City are being gradually developed and her output steadily increased, and

little doubt is entertained but that the output of 1891 in Park City will be at least double that of any previous year. Mr. Daly says active work will commence as soon as the snow is off the ground and trouble from surface water ceases. The papers may do all the howling they wish concerning Deep Creek, Dugway and other districts, but when the grand total is figured up, it will be found that Park City is the king pin in the whole list, if she does not turn out more ore and bullion than all the balance put together.

WASHINGTON.

SKAGIT'S MINERAL WEALTH.—*Mining News*, May 16: During the last year no mining region has attracted so much attention as that portion of Skagit county lying at the head of Cascade river, on the dividing line between Skagit and Okanogan counties, not known as the Cascade mining district. The *News* is indebted to Geo. Rouse for the following summary of the work done, and the present outlook for the various mines: The Boston vein, now owned by a syndicate of Helena men, is nine feet wide, three feet of clean ore running 100 ounces to the ton, and six feet of concentrating ore. A tunnel has been run in for some distance on this vein. The Epoch is a small vein containing 16 ounces of clean ore and 20 ounces of lead ore. The Ontario is a 16-foot vein, undeveloped. The Queen Sabie, although a small vein, being only three feet in width, is very rich. A tunnel has been run in on this vein at a distance of 82 feet. The Doubtful is a 20-foot vein. On this lode a drift has been run in for distance of 55 feet. El Capitan is a ledge of 20 feet in width. The Galena shows an 18-foot vein, on which a drift has been run for a distance of eight feet. The Franklin is a five-foot ledge with three feet of good ore. On this vein a drift has been run for a distance of 12 feet. The Adolph is a six-foot ledge which has been tunneled for the distance of 12 feet. The Cascade, a monster of 20 feet in width, has been tunneled for a distance of 100 feet. The Kildare yields rock that assays 100 ounces to the ton and shows a superior grade of ore. In addition to these mentioned are numerous other ledges which have been located, but are entirely undeveloped. There is no mining section that is attracting so much attention at present as this new El Dorado, and the coming season will witness great development of these valuable mines. If this section proves as rich as the prospects warrant, there will be a large city built at some point on the upper river, probably in the vicinity of Sauk, or possibly a little farther up the river. The greatest need at present is a road over which supplies can be taken. At present it costs a small fortune to pack in the supplies that are absolutely needed. It is a matter of great importance to this county that the commissioners take some action looking to the opening of a wagon-road from the mouth of the Sauk to the mines. A liberal appropriation by the county for the opening of the Cascade road will be a judicious investment and will return a hundred fold of the outlay to the county.

COAL.—*Ellensburg Capital*, May 14: It is said that an effort will be made to save the big blocks of coal from the Roslyn mine, which were used in the arches at Tacoma on the occasion of the President's reception, for use at the World's fair. One of these blocks weighs 17,000 pounds and is the largest ever produced in this State. It is proposed to have the arches in the Washington exhibit made only of the productions of the State, and the blocks of coal may be utilized in this manner. This will be a good advertisement of our State and county at the grandest Exposition the world has ever known.

IRON.—Joshua Pierce made a report of a trip to Ellensburg and the Skagit valley in the interest of the iron industry. He was convinced that there were immense fields of iron in both these localities and that Tacoma could not do anything more profitable than to foster them. It did not make so much difference where, but either on the Sound or on the main line of the Northern Pacific would be directly tributary to Tacoma and, therefore, more beneficial. Mr. Pierce was very earnest about the matter and entreated several members of the Chamber of Commerce to talk. They were unanimous in thinking something should be done to develop this important interest.

ABOUT MINES AND MINERS.—*Okanogan Outlook*, May 8: J. W. McGregor, Ben Hedrick and Henry Doheny returned Wednesday from Palmer Mt., where they have been doing development work on the Yellowstone and Gladstone claims. Sieve Howland, who has the contract to sink a hundred feet on the Ivanhoe, was in Concoully Thursday after supplies. He reports that they are now down 30 feet and sinking at the rate of two feet per day. John and Rol Seibert are working on their gold properties on Palmer Mountain. They have located an extension to the Fairview lead, which has produced some of the handsomest free gold specimens ever found in the country. The boys have several good prospects in the district, any one of which is liable to make them rich. Gus Leiber left Wednesday morning with a wagon load of tools and provisions for the Lime Bluff district, where he will spend several months doing development work on the Eureka and Lulu claims, in both of which he is interested. Geo. Cooper returned Monday from a trip to Tacoma. Mr. Cooper was interested with T. L. Nixon in a number of mining claims in this district. He informs us that the death of Mr. Nixon will not interfere with the development of his properties here, as everything was bequeathed to his wife, who has signified her intention of carrying out her husband's plans and schemes as near as possible. She will spend several thousand dollars in developing her mining interests on Mineral hill. Development operations are now fairly under way at the Ivanhoe mine. A force of men are engaged in sinking a new shaft for the purpose of determining the dip of the vein, which at the surface lies almost horizontal, but gradually assumes an upright position as depth is gained. They are now at work with a plow and scraper, removing the soil and uncovering the vein. Mr. Cowherd estimates that the amount of ore which has been uncovered in this way exceeds 1000 tons. One man will be kept employed all summer sorting ore for shipment to the Tacoma smelter. George Forrester, superintendent of the Toughnut, informs us that Col. Wallace has returned from San Francisco and will be in shortly to commence work on the mine. The amount of development which the company proposes to do this season will give employment to about 20 men.

MECHANICAL PROGRESS

Improved Manufacture of Staybolts and Tubes.

A device has recently been patented for rolling hollow staybolts, and a company formed for their manufacture at Cuyahoga, Ohio. The process is described as follows: Two pieces of iron rolled in U-shaped section are laid together and wired in that position. These parts are then heated to a welding heat and run through rolls. As the welded tube comes from the rolls it passes over a mandrel, which fills the interior. Before reaching the second pair of rolls it cools slightly and shrinks upon the mandrel. In the second pair of rolls it is drawn from the mandrel and the interior cleared by slag and cinder. In this way, by five repeated operations, a hollow staybolt is obtained, which has a uniform interior diameter. The material, of course, must be of the very best quality of charcoal iron. The helts are made in lengths of about six feet. The advantages of hollow staybolts are well understood. A considerable saving in expense can be made by using hollow staybolt iron, instead of drilling the ends of the bolts after they are in position.

Compound Metallic Tubes.

Nearly allied to the above is a new process for the manufacture of compound metallic tubes, tubes of one metal, covered or lined, or both, with another metal, invented by Geo. H. Everson of Pittsburgh. To line a tube a hard mandrel is taken, the diameter of which is the same as desired for the inside of the lining of the tube when finished. The metal lining is then placed around the mandrel, and rolled through or between hard surfaced rolls, until the lining is reduced to the desired thickness. Then the tube that is to be used is slipped over the lining, and the rolling process continued until the tube is rolled tightly into the lining, and reduced to the outside diameter desired, after which the mandrel is removed and the tube cleaned. If it is desired to cover the tube as well as line it, the mandrel is put inside the lining, the metal cover is slipped over the tube, and the rolling process continued, until the metal cover is rolled down tightly upon the outside of the tube, and the thickness of the covering desired is obtained, after which the mandrel is removed, and the compound tube finished in the ordinary manner.

Labor-Saving Machinery.

Much has been said of late in regard to the influence of labor-saving machinery on the scope of labor, and it has been stontly held by many that the present condition and future prospects of mechanics in this country (England) are far less satisfactory than they were in our earlier history, before the great advance in the introduction of labor-saving machinery. But the most careful-thinking people, even among our best mechanics, hold to the contrary and refute the argument used by the grumblers who say that the mechanic is not so much in demand, and not so much respected, socially, as he once was. At the time when steamboats, railroads and labor-saving machines were beginning to be constructed, no doubt wages were good, and the services of the mechanic held in high value. Circumstances then were such that for a time an unusually lively impetus was given to that department of labor peculiar to his vocation. The field was wide and sparsely tilled, and with no great degree of effort yielded rich returns. But after all, the methods of the time, if enterprising and vigorous, were yet rude, and of a nature necessarily so transitory that they soon yielded before more disciplined efforts and more careful, exacting and intelligent requirements. So the hasty methods of the mechanics of former days, and the few rude appliances and tools they used, did good work in their time, but would not be suitable now. With the growth of the country, machinery has increased, and the mechanic has commensurably gained in intelligence. The result is natural enough, and desirable. Now we make more devices in a day than would have sufficed for a month 30 or 40 years ago, and modifications and improvements, one after another, crowd upon each other with astonishing rapidity. The mechanics of to-day are obliged to make themselves acquainted with the manner of operating multifarious contrivances, and in such connection must continually make practical application of many of the principles of natural philosophy, the laws regulating steam, etc. Who doubts that many more well-educated and intelligent men are found among the ranks of British craftsmen than formerly? If anything, the community awards the best and most worthy members of this class a higher social position than that possessed by their predecessors of a generation or more ago.—*Machinery, London.*

TWISTED NAILS.—The newest thing in nails is a twisted wire nail, which is a cross between a screw and an ordinary plain wire nail. The idea is of English origin, and it is supposed to represent as great an improvement upon the plain wire nail, as that useful invention is over the old iron nail. As is well known, the common iron nail tears and crushes the fibers of the wood as it is driven, and its tapering shape destroys the greater portion of its holding powers when it is partially withdrawn. The plain

wire nail being pointed and smooth, does not crush the wood fibers as the iron nail does, but presses them aside. As the diameter of the nail is the same throughout its length, it fits as tightly and holds as firmly when partially drawn as when driven home. The twisted wire nail not only crushes the fibers of the wood less than the other two forms of nail, but by its screw shape possesses a much greater holding power than either of the other forms. Quite similar to this screw modification of the wire nail is the recent American idea of making a wood screw that will drive nearly as well as a nail, and yet can be withdrawn by means of a screw-driver as readily as any screw.

Iron and Steel Ships Without Frames.

Patents have been granted in England for a new method of shipbuilding that will probably reduce the cost of punching and riveting from 80 to 90 per cent. Should the experimental ship now under construction on the Thames prove successful, lake shipbuilders will be interested as—per cent of the cost of steel steamers on the lakes is charged to punching and riveting, and if four-fifths of that could be retrenched by this new process, in addition to the cost of framing material, it would be worth consideration.

Industries, London, has the following to say of the invention: "Naval architects have for many years attempted to apply hydraulic riveting to the building of our ships, but hitherto they have only succeeded in applying it to a very limited part of the structure. A new method, which will admit of the complete application of hydraulic riveting, the invention of Mr. A. C. Holzappel, of 57 Fenchurch street, London, about to be introduced, consists of building a ship of holed plates, or plates flanged on all four sides. The invention was thoroughly studied by Mr. Holzappel in conjunction with several naval architects and engineers, and he has now so far progressed as to arrange for the building of a trial ship, a vessel of small size, to be built on the river Thames.

It will be seen that the adoption of this method dispenses entirely with the use of frames and keelsons, and that the flanges of the plates will form an ample substitute for these. For riveting together these flanges a movable hydraulic machine of very light structure can be used, and a similar machine will also be used for the punching of the rivet holes, both being simultaneously punched, and the rivet holes being in consequence perfectly fair. Countersinking and surface riveting is consequently entirely dispensed with, and the labor required for the punching and riveting will be reduced from 80 to 90 per cent on the present total for wages. A second patent for simultaneously shaping and flanging the plates, will also be acquired by the company, but the ultimate intention is, should the method under notice prove a practical success, to shape and flange the plates in heavy cast iron or cast steel dies by powerful hydraulic pressure, and to then build a large number of ships of the same sizes and models.

This experiment in a quite new departure in shipbuilding will no doubt be watched with much interest by shipbuilders everywhere. Should the expectations of the inventor be fully realized, this method will prove a very important advance step in the economy of iron shipbuilding.

CASTING IN BRONZE.—American foundries do not as yet seem to succeed with bronze castings of any great size. There is one foundry in New York which can do good work, but the statue of Columbus, on the Drake fountain in Chicago, will be cast in Florence. Prohasco, who is having the Grant statue done for Lincoln Park, will have to have his statue cast in parts, and one of the hind quarters had to be recast entirely. The art of casting big statues all in one piece had long been lost, but it has been rediscovered. The process is called *cera perdue*. The other method is the sand process, just like that used for stove castings, but the joints have to be filed smooth and then soldered. In that way the artist's touch is lost and the skin of the metal, the patina, is scratched and spoiled. The *cera perdue* is the wax process. First the clay model is made. Then a plaister reproduction of that is made. From that is taken a matrix. That is coated inside with wax as thick as it is desired to have the bronze, say a quarter of an inch. A core is put inside of that, which would be a mold of the inside of the statue when completed. There is a hole in the bottom of this matrix. It is put in a pit and heated until all the wax is melted and runs out. The melted bronze is poured in between the core and the matrix, and there's your bronze casting. It costs about \$1000 more than the sand process for each statue, but it is much preferable.—*Age of Steel.*

"**Pig Iron**" is a mere play upon the word sow. When iron is melted, it runs off into a channel called a sow, the lateral branches of which are called the pigs. Here the iron cools, and is called pig iron. Sow has nothing to do with swine, but is from the Saxon 'sawan,' to scatter.

AMERICAN HARDWARE FOR SIBERIA.—A large shipment of hatchets was recently made from this city, upon special order, for Siberia. That country is beginning to be a large buyer of agricultural implements, and it will continue to grow in importance from year to year.

SCIENTIFIC PROGRESS.

A New Solvent for Cellulose.

Hitherto we have had no acid solvent for cellulose but such as in dissolving it bring about marked changes in composition and properties. In dissolving, the cellulose is resolved, *e. g.*, by the action of sulphuric and phosphoric acids, into products of lower molecular weight and cannot be recovered from the solution. Concentrated hydrochloric acid, as is well known, attacks cellulose profoundly. When digested with the acid in the cold the fibers are completely disintegrated, and the resulting modification, obtained as a white powder, manifests very different properties from the original. When warmed with aqueous solutions of the alkalis it is colored deep yellow, and the products of hydrolysis are powerful reducing agents (aldehydes).

This observation is of importance, as it enables us to investigate some points in the constitution of cellulose for the determination of which such an acid solution is an essential condition. The solution of cellulose obtained by heating it with concentrated solutions of zinc chloride may also be diluted with hydrochloric acid, without precipitating the dissolved products, but the solution by the new reagent has the double advantage of being instantaneous and of being prepared, therefore, with the minimum of resolution of the cellulose into bodies of lower molecular weight which usually attends the somewhat prolonged heating necessary for complete solution in the aqueous solution of zinc chloride.

The reagent we also find of great value in the investigation of structural points, *i. e.*, as an acid to microscopic work in the province of the vegetable fibers. All forms of pure cellulose are rapidly dissolved by the reagent, and the various stages preceding their final disappearance may be observed under the microscope, the observation throwing much light on structural peculiarities. The raw fibers, *e. g.*, cotton and flax, are not dissolved, at least only partially, but swell up under the action of the reagent, with the result that the structural features are brought out with great prominence. Jute and the ligno-celluloses generally are dissolved by the reagent, and many of the adpol-celluloses also. We are investigating these actions more closely and hope shortly to publish an account of our observations. In the meanwhile we commend the reagent in question to all who are engaged in the chemical or microscopic investigation of the vegetable fibers.—*Chemical News.*

How Ice is Formed

A person who has never closely observed the operation of nature's great ice factory will be surprised to find how interesting it is. You need not go outside of a comfortably heated room to do this. Just place a pan of water on the window sill, when the temperature is below the freezing point, and you will soon see something that cannot fail to interest you. If you happen to have a magnifying glass, a single lens, so much the better, for the magnifying power will reveal much of the delicate work of ice making that is invisible to the naked eye.

Anyway, as you closely watch the surface of the water you will soon see tiny little lances, very beautiful when seen under the microscope, shooting hither and thither on the surface of the water. If it is cold enough to make ice in the sunlight the crystal lances will glow with all the colors of the rainbow, and, as they dart about, the rapid changes of color will remind you of the wonders of the kaleidoscope. As the water continues to chill, the little lances come together, and then smaller and still more delicate crystals will be seen forming between the lances and welding them together. This process goes on until the surface is covered with a beautiful film of ice hardly strong enough to bear the weight of a mosquito. But the process goes on under this superficial layer, and a smooth and solid surface is the result.

Water is affected by changes of temperature differently from all other liquids. It seems to be a natural law for all liquids to expand in proportion to their increase in temperature, but there is a strange exception to the rule in the case of water. For example, take a quantity of water when exactly at the freezing point, 32 degrees above zero, and place it over a fire. As the temperature rises the volume will contract, contrary to the rule, until the water is about seven degrees warmer than it was at the beginning of the experiment. At that point, however, there is a sudden change. Contraction ceases, expansion begins, and the volume increases until the water is converted into steam.—*Pittsburgh Dispatch.*

DIAMONDS CAPABLE OF ABSORBING LIGHT.—A recent issue of the *Journal* of the Franklin Institute contains a paper on precious stones by Mr. George F. Kunz, who describes some exceedingly interesting and beautiful experiments on phosphorescent diamonds which he was enabled to make in Paris during the Exposition, through the courtesy of prominent scientific men. A dark room was provided, in which was placed a collection of over 150 diamonds. In a side of the wall a lens was inserted, and outside of the room a new alternating arc lamp of the Thomson-Houston system was hung. The lens, which was employed to concentrate the light, was covered

with a violet colored glass, so that the only ultra violet rays fell on the gems, of which but three of the entire number proved to be phosphorescent. All the others assumed a beautiful violet tint. The two stones whose phosphorescence were most marked were perfectly transparent white stones, one having a bluish tinge. Mr. Kunz says: "The phosphorescence exhibited by these stones was extremely beautiful; it remained visible when a metallic cap was put over the lens—gradually losing its intensity, however—for 15 minutes after the exposure." All the other stones were invisible in the dark.

Romance of the Sky.

By the increased power of telescopes, the number of stars within our ken has been increased from 2000, the number which may be seen in both hemispheres by the naked eye, to probably about 80,000,000. The star nearest to the earth, α Centauri, is about 275,000 times as far from us as the sun is, and Sirius is about twice as far away as that; if, however, we could view these bodies at an equal distance, α Centauri would appear nearly twice as bright as our sun, and Sirius 40 times as bright.

Star 61, Cygni, has a velocity of not less than 30 miles a second, or 3,000,000 miles a day. So far, then, we find that the stars are at different distances; that they are of different sizes, and that, instead of being fixed, they are all in movement.

Such bodies are masses of glowing gas, the materials of which are, for the most part, precisely the same as those of which our earth is built up, the great difference between such stars and the earth at the present time being that they are hot, while the earth is cold.

The sun is so hot at present that its outer atmosphere, instead of being composed of cool oxygen and nitrogen and water vapor, as happens with our own, consists of brightly shining hydrogen gas and iron vapor chiefly. The iron is not solid and it is not molten, but exists as iron steam at, perhaps, a distance of 200,000 miles above the shining orb that we see and call the sun. This, I think, may be taken as a fair indication that the sun is a very hot body, especially when we remember that as its center is approached, the temperature must always increase.

I have said this much about the sun, because it is very natural to ask whether all stars are like the sun. It used to be thought that they were, but I, for one, do not think this is so. When we come to examine the bodies which shine in the sky, those dim patches of gray light called nebulae, as well as many of the stars themselves, the prism tells us that the light which they send to us is very different from the light sent to us by the sun and by other stars, the light of which is exactly like sunlight.

A great deal of work recently done shows that probably many stars, instead of being like the sun, are built up, as the comets are, of enormous clouds or swarms of little bodies, some of them, perhaps, no bigger than grains of dust, the different quantities and qualities of the light given out depending upon the motions of these little particles and the average distance between them.

So, when we have a great many of these little masses closely packed together and moving rapidly, they will have an opportunity to strike one another and thus produce light and heat in a greater degree than can happen in those other so-called "stars," where the dust is sparser and the motion less rapid.

This is an idea which has lately been suggested, and I refer to it here because it appears to make clear a great many points on which children even of a larger growth have long been puzzled.

In this way, we pass from what we see in the heavens as patches of milk-white light, called nebulae, to other bodies even hotter than our sun, and when the stage is reached in which we see specks of light merely, and deal with "stars," properly so called, we get a hot body which increases in temperature as all the little particles arrive at the center, until the motion of all of them has been changed into heat, and a ball of vapor results, very, very hot.

As soon as the supply of heat ceases, the mass begins to cool. Our sun is such a cooling mass. The cooling goes on until at last a body such as our own earth is formed. This is why it is that the chemical composition of the sun and earth are so similar.

If this is what really happens, we can easily explain the colors of all the stars. Each stage of heat in a star has its own special color. It is true that sometimes very nearly the same color is produced at two different stages of heat; but aside from this, we know that very white stars are at the condition of their greatest heat, and that yellow stars are cooler, though some are old, some young; and that very red, but especially blood-red stars, are tottering on the verge of invisibility, having run through all their changes.—*Norman Lockyer.*

HEAT AND THE ELECTRIC CURRENT.—Cold copper wire offers less resistance to an electric current than a hot wire. The resistance increases at the rate of about one-fifth per cent for each Fahrenheit degree of rise in temperature.

A SWEDISH engineer claims to have invented a new machine for making horsehoe nails out of iron rods, the machinery making 140 strokes per minute, each stroke producing two nails,

ELECTRICITY.

Device for Protection from Accidental Heavy Currents.

Mr. Albert Barrett, electrician of a telephone company in Kansas City, has invented a device for protecting telephone and other wires from heavy currents, as when a telephone wire falls across a badly insulated electric light conductor or the trolley wire of an electric railway, in which cases the results are, as a rule, quite disastrous. To protect from these powerful wandering currents the necessarily delicate and expensive mechanism employed in telephone and telegraph systems, is a problem to which a number of electricians have devoted so little time. The invention in question forms a cut-out which is said to be operating satisfactorily, and is employed, it is stated, quite extensively on the switch-boards in that city and at many other points. The construction of the cut-out is quite simple. The line wire is cut and each of the two ends is fastened to the binding-screws. A very fine German silver fuse wire connects the binding screws. The fuse wire is arranged in a peculiar manner. Before being put in place it is passed through and by means of a little drop of wax molded on to, so to speak, a small loop of cord. The loop of cord is passed up through an eye and, as the drop of wax is a little larger than the eye, serves to hold down a spring. The operation of the cut-out is as follows: The moment a current of dangerous volume passes through the fuse wire, the wax button holding the loop and spring in place, melts. This action sets free the spring and the quick jerk of the loop through which the heated wire passes, breaks the latter.

A Lightning Arrestor.

Another device, the invention of Elihu Thompson, of Lynn, Mass., grapples even with the lightning of the clouds, and arrests even the most powerful current of electricity, in such a manner as to cause it to pass off harmlessly, even where there is no lightning rod to guide it to earth.

This instrument is based on the principle that where the discharge spaces in an arrester are in series and of a total length when added together, equal to several times that over which the discharge could pass if caused to leap across the single pair of discharge plates in an ordinary lightning arrester, there is secured not only freedom of discharge of current but at the same time freedom from the formation of and continuance of arcs between the discharge surfaces. In other words, Prof. Thompson finds that when a discharge has taken place, and the potential of the line is such as would tend to maintain an arc at the breaks, the potential can readily be made insufficient to do so by multiplying the number of striking spaces. He also finds that an arc is much more readily maintained between two plates with a single wide space than between a succession of discharge points or over a succession of spaces placed in series.

This device can be made effective for any current, however powerful, by simply increasing the number of discharge or jumping points. By causing the necessity for a constant jumping of the current, it virtually becomes perfectly discouraged, as it were, and its strength is dissipated by the great number of hindrances thus placed in its path. It is thus that inventors are gradually reaching out and surrounding the now dangerous power by safety devices so numerous and so effective that electricity will soon become the most safe, as well as the simplest power, which men can employ.

ELECTRIC ROADS PAY.—It is a noteworthy fact that nearly all the roads throughout the country which have adopted electricity as their motive power have increased their business, and many of them are extending their rails. This is good evidence that such roads are paying investments. The Waterville and Fairfield road, in Maine, is reported to have nearly doubled its business since it commenced operating by electricity. The increase in business of the Boston West End Company, according to the statement of its president, has been over 30 per cent. Electric railroads have come to stay.

ELECTRICAL UTILIZATION OF INSECTS.—An electric apparatus supplies a strong light which attracts the insects and moths; a suction fan worked by the electric current draws them in when they approach the light and carries them into a small mill, also worked by the electric current, where they are ground up and mixed with flour, and thus converted into poultry food of excellent quality. This is said to be a Bavarian contrivance.

TO REDUCE THE BRILLIANCY.—The brilliancy of the incandescent electric lamp is often a serious objection to its use, and a very simple method of modifying its dazzling glare has been suggested. All that is necessary is to dip the glass in a saturated solution of alum and water, and then apply, when dry, a coat of collodion as a protection. This is said to make the light very soft and agreeable, even to the most sensitive eyes.

The San Francisco and San Mateo Railroad Company has let a contract for 16 miles of steel rails to the Pacific Rolling Mills of this city.

GOOD HEALTH.

HEALTH OF THE STATE.—The State Board of Health for April reports: Mortality from 67 cities, towns and localities, having a population of 674,830, show 1064 deaths to have occurred from all causes. This is a percentage of 1.57 per 1000 per month, or 18.84 per 1000 per annum. Consumption was the cause in 164 cases, pneumonia in 153, bronchitis in 40 and congestion of the lungs in 8. Diarrhoea and dysentery are assigned as the cause of 7 deaths, cholera infantum 3, and of other diseases of the stomach and bowels 51. Croup caused 21 deaths, scarlatina but 1, whooping cough 3, typhoid fever 14, malarial fever 3, cerebrospinal fever 6, cancer 29, erysipelas 1, heart disease 63, alcoholism 13, and all other causes, not necessarily classified 436. Of this last number la grippe is responsible for 13 deaths, and there is a reasonable presumption that many fatal cases of lung disease are traceable directly to an attack of that disease. Diphtheria caused death in 48 cases, San Francisco furnishing 27. The deaths reported for cancer were 29, 16 of which occurred in San Francisco. It should be borne in mind that reports are received from only a little over one-half the population of the State. The only disease that may be said to prevail extensively is la grippe, 363 cases being reported from different parts of the State with an accredited fatality of 13. San Francisco, Los Angeles, San Diego and other southern points of importance report none at all. Oakland, Alameda and San Jose are almost, if not altogether, exempt. The progress of this remarkable malady has been somewhat erratic, following no well-defined course and requiring no unusual local conditions for its development.

EFFECT OF COLD WEATHER ON THE AGED.—The recent cold weather in Europe serves to strongly illustrate the inability of the aged to withstand exposure. A recent number of the *London News* states that in the second week of December, 1890, the number of deaths among persons 80 years old reached 100, while during the following three weeks, which were so unprecedentedly cold, the number increased to 116, 142, 148. In persons afflicted with diseases of the throat and chest, the average was doubled. While the fact that such severe weather is unusual there, and that people were not prepared to meet its rigors, accounts in a degree for the high rate of mortality, reference to the returns of our Philadelphia Board of Health shows that the rate here, where cold weather is not unusual, is decidedly higher in the colder months (in the months of January, February and March) than in the warmer months. It is of the utmost importance that aged people expose themselves as little as possible during extremely cold or inclement weather, and when necessity compels them to do so, that they shall be protected. No doubt, if the increased danger were sufficiently insisted on, in spite of the difficulty in making the average octogenarian realize that he is no longer young, the lives of many of the aged people would be greatly prolonged.—*Ez.*

HOW TO READ THE TONGUE.—The perfectly healthy tongue is clean, moist, lies loosely in the mouth, is round at the edge, and has no prominent papillae. The tongue may be furrowed from local causes or from sympathy with the stomach, intestines or liver. The dry tongue occurs most frequently in fever, and indicates nervous prostration or depression. A white tongue is diagnostic simply of the febrile condition, with, perhaps, a sour stomach. When it is moist and yellowish-brown, it shows disordered digestion. Dry and brown indicates a low state of the system, possibly typhoid. When the tongue is dry and red and smooth, look out for inflammation, gastric or intestinal. When the papillae on the end of the tongue are raised and very red, we call it a strawberry tongue, and that means scarlet fever. Sharp, pointed, red tongue will hint of brain irritation or inflammation, and a yellow coating indicates liver derangement. When so much can be gained from examination of the tongue, how important it is that the youngest child should be taught to put it out so that it can be visible to the uttermost point in the throat.

A SEED TAKING ROOT IN A STOMACH.—A New York paper vouches for the improbable story that a New York boy suffered such intense pain in his stomach that a surgical operation was decided upon to remove the cause. On opening that organ the trouble was found to proceed from an orange seed lodged at the junction of the large and small intestines. The seed was greatly swollen and had a sprout an inch long. The boy stood the operation well; but upon his return to consciousness, he asked to see the cause of his suffering, and said it did not look one-tenth as big as it felt, and even laughed feebly at the idea of "an orange tree starting to grow inside of him." He rested easily after that, and it was thought he would get well, but peritonitis set in and he died the next day.

An ordinary transparent glass globe absorbs about 10 per cent of the light passing through it; ground glass absorbs 30 to 45 per cent, and opal glass from 50 to 60 per cent.

The brain of an elephant is remarkably small, not more than 1.23 as large as that of a human being in proportion to the weight of both.

USEFUL INFORMATION.

THE BREATHING OF A LOCOMOTIVE.—The "breathing" of a locomotive—that is to say, the number of puffs given by a railway engine during its journey—depends upon the circumstances of its driving wheels and their speed. No matter what the rate of speed may be, for every one round of the driving wheels a locomotive will give four puffs—two out of each cylinder, the cylinders being double. The sizes of driving wheels vary, some being 18, 19, 20, and even 22 feet in circumference, although they are generally made of about 20 feet. The express speed varies from 54 to 58 miles an hour. Taking the average circumference of the driving wheel to be 20 feet, and the speed per hour 50 miles, a locomotive will give, going at express speed, 880 puffs per minute, or 52,800 puffs per hour, the wheel revolving 13,200 times in 60 minutes, giving 1,056 puffs per mile. Therefore, an express going from London to Liverpool, a distance of 201½ miles, will throw out 213,048 puffs before arriving at its destination. During the tourist season of 1888 the journey from London to Edinburgh was accomplished in less than eight hours, the distance being 401 miles, giving a speed throughout of 50 miles an hour. A locomotive of an express train from London to Edinburgh, subject to the above conditions, will give 423,456 puffs.—*London Iron.*

UNITING LEAD PIPE.—What may be found a convenient method of uniting the ends of pipe, the *American Engineer* thus explains: Whatever the size of the pipe may be, procure a block of hard wood, say four or five inches long and four inches in diameter, bore a hole straight through the center, so nearly the size of the pipe that the block can be driven on the end of the pipe with a light hammer. If one has a set of augur bits, it will not be difficult to select a bit of the proper size to make a water-tight fit. Let the block be driven clear on the pipe so that the end of the pipe will be flush or even with the end of the block. Now place the two ends of the pipe together and drive the block off one pipe on to the other, until the joint will be at the middle of the block. If the hole in the block is made of the proper size, the block will fit so closely that the joint will be water-tight; and if the ends of the pipe are dressed off true and square, the joint will be so strong that it will sustain the pressure of a head or column of water 100 feet high. Iron pipe may be united in the same manner. Should the joint leak a trifle, let shingle nails be driven into the wood around the pipe so as to press the timber firmly all around the pipe.

WHY BLOOD TIN RUSTS.—Tin plate is made by coating sheets of iron with a layer of tin. The best kind is known as black tin, being that which is covered with the thickest layer of tin and afterward hammered upon a polished anvil, in order to consolidate the coating and make it adhere more firmly. On being exposed to the action of the air, pure tin is not affected at ordinary temperatures. As soon, however, as a portion of the tin is removed by injury so as to expose even a tiny speck of iron surface, corrosion at once sets in and proceeds very rapidly. The reason of this is of an electrical nature. Iron and tin together form what is called a "galvanic couple," which will decompose the water (charged with carbonic acid) deposited upon them from the air. Oxygen and hydrogen gases are liberated, and the iron, having the greater affinity for the oxygen, is the metal attacked. Such corrosion is very rapid when the exposed iron surface comes in contact with water highly charged with carbonic acid in a mineral water factory.—*Mineral Water Review.*

NEW DECORATIVE PROCESS.—A new process by which artistic designs can be photographed on paper, cotton cloth, velvet and other fabrics, is becoming the "rage" in England, as any lady can, by its means take any white fabric and print upon it designs to suit her own taste, and in which pressed leaves will serve instead of a transparency for the production of many effects. At a recent meeting of the Photographic Society, England, a well known photographer printed different leaf patterns upon different parts of a piece of white cotton cloth. He then developed the different patterns with various developers by applying each of the latter locally with a brush; the result was a pretty series of designs in variegated colors upon one piece of cloth. The colors at present obtainable by the use of developers in the process are red, orange, purple and maroon; by mixing the purple and orange developers an unsatisfactory kind of an approach to green is said to have been obtained. Developers to yield blues and greens with this process have yet to be discovered.

IMPROVEMENTS IN MANUFACTURING SPIKES. Some interesting experiments have been made in the manufacture of spikes, with a view to making a finished article by rolling the bar in such a manner that its width shall be the length of the spike, and in such shape that the spikes may be cut from it with shears, similarly as a cut nail is made, except that the head is made in the rolling process. In tests made by running through some steel nails that had been slowly heated for 2½ hours, the result showed that the mechanism might be adapted to the object aimed at.

ENGINEERING NOTES.

Enormous Force of Hydraulic Streams.

The enormous force of a stream of water forced from a hydraulic nozzle, under from 200 to 300 feet or more of pressure, as sometimes used in hydraulic mining in this State, is something almost beyond belief. The quantity of water passing through these nozzles in a single day of mining is immense. A stream of 400 feet vertical pressure delivers a blow of upwards of 500,000 foot pounds—equivalent to about 1000 horse power.

Louis Glass, who for 16 years was superintendent of one of the large mines in this State, states that he has seen an eight-inch stream, under 311 feet of vertical pressure, move in a sluggish way a two-ton howler at a distance of 20 feet from the nozzle, and that the same stream, striking a rock of 500 pounds, would throw it as a man would throw a 20-pound weight. "No man that ever lived," adds Mr. Glass, "could strike a bar through one of these streams within 20 feet of discharge, and a man being struck by such a stream would be pounded into a shapeless mass." Mr. Augustus J. Bowie of this city, the author of a standard book on hydraulic mining, says it would be absolutely impossible to cut such a stream with an ax, or to make an impression on it with any other instrument. Mr. Bowie adds that, although never to his knowledge has a man been struck by such a stream as it comes from the pipe, several accidents have occurred where miners were killed by very much smaller streams at distances of 150 or 200 feet from the nozzle.

Prof. Christy says he has often tried to drive a crowbar into such a stream; and it felt as solid as a bar of iron, and, although he could feel the point of the crowbar enter the water for perhaps half an inch, the bar was thrown forward with such force that it was almost impossible to retain it in the grasp. An ax swung by the most powerful man alive could not penetrate the stream; yet it might be cut by the finger of a child, if the child were seated on a railway train moving parallel with the stream in the same direction and with the same velocity. That velocity would be considerably more than a mile a minute.

The statements presented in the above summary will not astonish engineering experts; the average citizen, however, is accustomed to regard water as the least destructive liquid that can be put in motion, and he is familiar with no stronger manifestation of its power than the velvety touch of a stream from the city faucet.

It might occur to a military man that such a powerful agent might be made a most terrible military agent for offense or defense, at short range, if it could only be brought to bear, as indeed it might be by a powerful steam-engine in a beleaguered fort or on board a battle-ship with an enemy close alongside.

THE PROPOSED IRISH CHANNEL TUNNEL is still a topic for discussion among English engineers. There seems to be no fear in this case that the tunnel might be made the route for invasion by a foreign army, although when the tunnel beneath the English channel was under discussion the idea that in time of war the tunnel might be a convenient means for invading England proved an insurmountable barrier to the enterprise. Besides the proposed tunnel, for which four routes have been suggested, there have been proposals to build a submerged tubular bridge about 60 feet below the surface of the water, a causeway after the fashion of a breakwater, and a series of great cantilever spans like an extended Forth bridge. The tunnel, however, seems the most feasible plan for making the crossing, and its cost is estimated at from \$25,000,000 to \$50,000,000.

THE CANADIAN PACIFIC was the first railway company on this continent to control and operate a through transcontinental line from ocean to ocean. It is now the first of the lines to the Pacific Coast to secure an entrance to New York City. The effect of this new route for freight traffic to the Northwest remains to be seen. As it has direct and short water communication between its western terminus and this city and Oregon, it goes without saying that it cannot fail, under existing custom-house regulations, to interfere more or less with the legitimate business with our own roads. A road built almost exclusively by Government aid and run in the interest of its Government must prove a most successful rival to any road built and operated by individuals.

YEARS ago competition in the way of swift ocean passages was between sailing vessels instead of between steamships. Then it was the "Yankee" clippers beat the world, and the recent passage of the clipper *Saint Paul* from Queensland to New York in 16 days shows that the making and handling of sailing vessels is not among the lost arts.

AN IMMENSE MOUNTAIN BRIDGE.—A bridge has recently been completed on a Peruvian Central Railway which spans a chasm with almost vertical sides and 235 feet in width. The bridge is of wrought iron and of the cantilever type, supported on two iron towers. Its total length is 575 feet, its suspended span being 105 feet long.



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Saturday, May 23, 1891.

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Passing Events.

Adhering to our custom, we write the above heading in the plural, though there is this week but a single event worthy of a place in this department of our paper. This portentous accident has not as yet transpired, but as we write it impends, and in another hour or two it will have been precipitated with all its momentous consequences. A couple of hrisers are on the eve of entering the fistic arena, and may even now be engaged inflicting on each other a well-deserved maning. At least half the community stand agog, waiting the result of the pummeling with breathless anxiety. Unfortunately, however, terminate the sorim-age as it may, neither of the men engaged in it will be apt to kill the other, and thus will society be exposed to be some day further equalized by another set-to between these hrutes.

But for this occurrence a number of news items would this week have claimed attention, such as the formation at Cincinnati of a third national party, the pursuit of the Itata, the revolt in Chilli, the wide-spread labor troubles here and elsewhere, not to mention various

other happenings of general interest. In the presence of this supreme event minor matters may, however, well be ignored. Next week, when ordinary affairs shall have recovered from the obscuration of this overshadowing transaction, when the current of business shall have unhindered to its usual channels and all things have become normal once more, we shall go on recording the outstanding occurrences of the day after the manner heretofore practiced, unless, to be sure, another prize fight should meantime obtrude itself on public attention!

A Glance Over the Mining Field.

As with our agricultural and most of our other leading industries, the business of mining in California is in a generally thrifty condition; not for a long time, in fact, has the outlook at this season of the year been more auspicious, this being especially true of quartz and hy-dranlic mining, these being so largely dependent on an ample water supply, which just now seems assured. The ground is full of moisture, the streams are already well replenished, and there is a good stock of snow on the mountains, which, the cool weather tending to conserve, will be likely to hold out far into the summer.

From our main gold-field favorable reports come to hand all the way from Siakiyon to San Diego, accounts from the lateral belts and the outside districts being equally satisfying. Whichever way we turn, the condition of the mining industry seems to be good and the outlook encouraging.

One year ago the state of affairs was quite different. The rivers, flooded by the heavy rains of the preceding winter, had swept away many of the dams, wheels, sluices and other portions of the miner's plant, the torrents descending from the mountains having destroyed large sections of his ditches and flumes. Before this damage could be repaired a good portion of the working season had in many instances gone by, the destruction of these works having in some cases been so complete that no attempt has since been made at repairing them. This year but little damage having been caused by high water, mining operations have nowhere been seriously delayed, having, in fact, been started up quite as early as usual, and as before remarked, under conditions pointing to an active and prosperous season.

Besides much new work likely to be undertaken in the department of vein mining, a decided impetus has been given of late to drift operations, the partial cessation of hydanlic washing having had a tendency to promote this branch of mining, the field for which is boundless and very inviting. So far from being exhausted or even seriously depleted, the old Pliocene channels of California, the principal sites of drift operations, remain almost virgin. We can mine along these channels for a hundred years, with just as good results as have here been reached in the past. It is indeed a notable fact that the returns from our "Dead Rivers" have for many years been growing better and better. We have in this line of mining no recent failures to record.

Passing over the Sierra Nevada, we come into a region where many of the conditions are unfriendly to mining, and where the history of the business is not, as a whole, a pleasant one to contemplate; yet even here this industry is being placed on a better footing, more than a thousand miners making good wages along the slopes of the Inyo range, where now, through the practice of carefully assorting or concentrating their ores, they are able to ship them in large quantities with profit. The silver mines over on that side, both at Calico, the principal district, and at other localities where the ores are reduced on the ground, are yielding fairly, and some of them remarkably well.

And this trans-Sierra is the territory of our borax-heds. Here in the depths of the deserts has been built up a quiet industry devoted to the manufacture of that strange but valuable salt, one of the peculiar products of that arid and sterile region, and here only on the Pacific Coast is soda made and refined in large quantity. Under the lee of this Inyo range, one of the most extensive granite quarries in the State has been opened, and is now being largely and successfully worked, the stone—capable of being gotten out in immense blocks—being of superior quality.

Looking again to the seaward side of the

Sierra we find here too this class of secondary mining industries actively and successfully prosecuted. Our cinnabar deposits, though not yielding as bountifully as in former years, are still the largest quicksilver producers in the world, and to their owners a source of considerable wealth. These mines are being worked constantly but in a moderate way, a steadily declining output admonishing to a careful husbandry of their resources. With snob diminished product and prospective dearth coupled with an increased demand for quicksilver it seems strange that the Altona deposit, the richest in the State, should be suffered to lie idle, now that the legal complications that so long prevented its being worked, have been settled and disposed of. The little capital required to restore the Altona mine to a profitably productive condition ought to be had at a day's notice.

After a long interregnum copper mining in California is again coming to the front. The Copperopolis group of claims, including the once prolific Union property, has within the past two years been rehabilitated; the underground workings having been nwatered, the reduction plant reconstructed and its capacity largely increased, active operations on the several smaller mines have been located elsewhere in the State, having meantime been continued. The probabilities are that our output of this metal will be much larger the present year than it has been for the past 20 years or more, during which the annual average has been less than a 1000 tons of ore or its equivalent in matte and regulus, hardly a quarter of what this year's product will amount to.

Our petroleum, asphaltum, salt, cement and lime interests are in like manner being fairly well prospered, while our stone and slate quarries are doing a large and thrifty business. In short every branch of mining in California is in a tolerably good condition, many of them better than ever before.

Rediscoveries in the Mining World!

There appeared in the last issue of the PRESS some editorial remarks on the Deep Creek country, Western Utah, now a locality of considerable interest in a mining point of view. Since writing that article we find that these Deep Creek discoveries are within the boundaries of what was formerly known as the Schell Creek district, the site of a very pronounced mining boom in the summer of 1872, nor do we know but that these discoveries are coincident with those made at that time.

Going back a little, it may be remarked, that on the collapse of the White Pine excitement in 1870, most of the prospectors who had been allured into that region scattered in various directions, some returning whence they came, but more making their way into the country adjacent on the south and east, there to prosecute their search after the rich mineral deposits they had hoped to find in and about Treasner Mountain.

Prosecuting their labors in the quarter indicated many auriferous lodes were discovered, and a number of mining districts organized during the following two or three years, principal among these being the Robinson, Schell Creek and the Fabranegat with others of lesser note. To none of these districts was there such a rush as to Schell Creek, toward which the emigration setting in during the spring of 1872, culminated before the autumn of that year, the life having gone out of the boom within a twelvemonth thereafter. While it lasted, however, matters here were very lively.

A town named after the district was laid out on the old Overland stage road, which here, after crossing Deep creek, followed up a long canyon that by an easy ascent reached nearly to the summit of the Schell Creek mountains, a low, sparsely timbered range lying to the east. At the entrance to this canyon, where it opened out into a little flat, the Overland Company had a station with some stables and a comfortable adobe house. In the furor for laying out new streets, this house, the only substantial structure in or near the place, was demolished to make way for the new thoroughfare, which it was held should not deviate a hair's breadth from a straight line. In this same spirit were all the improvements in the incipient metropolis projected and to some extent carried out, several fine buildings having been erected to serve the

various uses incident to pioneer mining towns.

A good deal of work was done on the mining claims taken up and generally with encouraging results, but the ore extracted, though of good grade, would not bear transportation to reduction works or a market, there being no mill in the district for working it. Well's Station, on the Central Pacific railroad, was away 75 miles to the north, Hamilton 80 miles to the west, while Salt Lake City was 130 miles to the East, these being the nearest points at which there existed any works for reducing the ore or facilities for shipping it by rail. The miners being under heavy expenses and unable to realize anything from their ores, were compelled to leave the district, which, by the end of 1873, had been almost wholly vacated.

If now, as reported, some rich metalliferous deposits have been found in the Deep Creek country, it is not matter for surprise, nor can snob finds be considered altogether new. As has frequently happened, this may be but another of those reanreations into life of what was before considered dead. Looking over the history of mining discovery on this coast, it does seem as if the labors of the pioneer prospectors were destined to a first failure. We are told on good authority that except the seed die it cannot be quickened into life; and so with the seed sown by these early explorers of our mineral domain; though much of it fell in stony places and dies, much after a timesprings up and yields an abundant harvest.

It is the onatom to speak lightly of this class of men, who, having, like these adventurers into the White Pine mountains, failed in the primary objects of their visit, have scattered and drifted away over the deserts, there to encounter further disappointment, and finally abandon the field in despair. But not always has their labor and their research been in vain, as witness many now flourishing camps throughout our mining regions that have experienced this sort of second growth; the districts that have gone through this process of undue excitement, basty abandonment and ultimate regeneration, being especially numerous in Oregon, Washington, Utah and Nevada.

A Highly Commendable Movement.

Charles J. King acting Secretary to the State Board of Charities, in a printed circular, advises the friends and supporters of that cause that the bill creating a "State Board of Charities and Corrections" introduced into the California Legislature at its last session failed to become a law by reason of the pressure incident to the closing of the session. That snob should have been the case was very unfortunate, as this measure, had it been enacted into a law, would have done much toward abating vice and relieving the wants of the needy in this State, by imparting system and efficiency to the efforts being directed to that end. This institution, already organized, has a human as well as an economic side to it, the former being with many its chief recommendation, nevertheless, administered in the manner proposed, this institution could be made the means of saving many thousands to the State annually, wherefore it behooves our people to see that the bill above mentioned be passed at the next sitting of the Legislature. If there are philanthropists willing to devote their time and means toward forwarding such a beneficent scheme, the State can hardly do less than aid them to the extent requested.

Mr. King in this circular returns thanks to the Hon. W. C. Hendricks, former Secretary of State, for the much interest taken in this cause; also to Mannel Brocklebank, Esq., for like services rendered, the latter, as we all know, having talked much and well in behalf of the poor and the suffering both here and elsewhere.

MENDING SLOWLY.—Wm. Ireian Jr., State Mineralogist, does not, we are sorry to learn, meet with speedy recovery from the accident that befell him some six or seven weeks ago. Falling down a flight of steps at that time, his leg was broken between the thigh and the knee. Since then the sufferer has been kept on his back, unable to so much as move the injured limb, a position that has tried both his patience and his fortitude sorely. It will yet be a week or two before Mr. Ireian will be able to get about even on crutches.

Suspension Cableways.

The great rock and ore excavation at Tilly Foster, N. Y., has attracted an immense amount of interest among engineers and contractors. Through the courtesy of the Lidgerwood Manufacturing Company, the prominent hoisting engine manufacturers of New York, Chicago and Boston, we are enabled to present in this issue several interesting sketches, made by them, illustrating this property and the working of the suspension cableways—a superior system of hoisting and conveying.

Fig. 1 is a general view of the mines looking southwest.

Fig. 2 is a plan showing the location of the cableways and railroad tracks. The plan shows an opening 450 feet long by 300 feet wide on the top; the depth of the pit is about 300 feet.

Fig. 3 shows a cross-section near incline cableway No. 3 and the horizontal cableway No. 4. A year ago the No. 3 cableway was remodeled with the Miller patent and its working is much improved. The invention refers to the device which supports the hoisting or fall rope. It is shown in the smaller sketch and consists of a simple wood and iron carrier which follows the carriage down the incline until stopped by a small steel button secured to an auxiliary rope placed above the main cable. A second carrier stops at a large button farther down the incline.

The cost of operating these cableways is something less than \$8 per day, in the course of which an average of 150 trips can be made. Each load being about a cubic yard, makes the entire cost for hoisting, conveying and delivering five cents per ton.

In this work there are employed by the contractors, Messrs. Stephens & Arnold, about a dozen Lidgerwood hoisting engines of the latest improved pattern; in fact, with one exception, the Lidgerwood engine is used to the exclusion of every other kind.

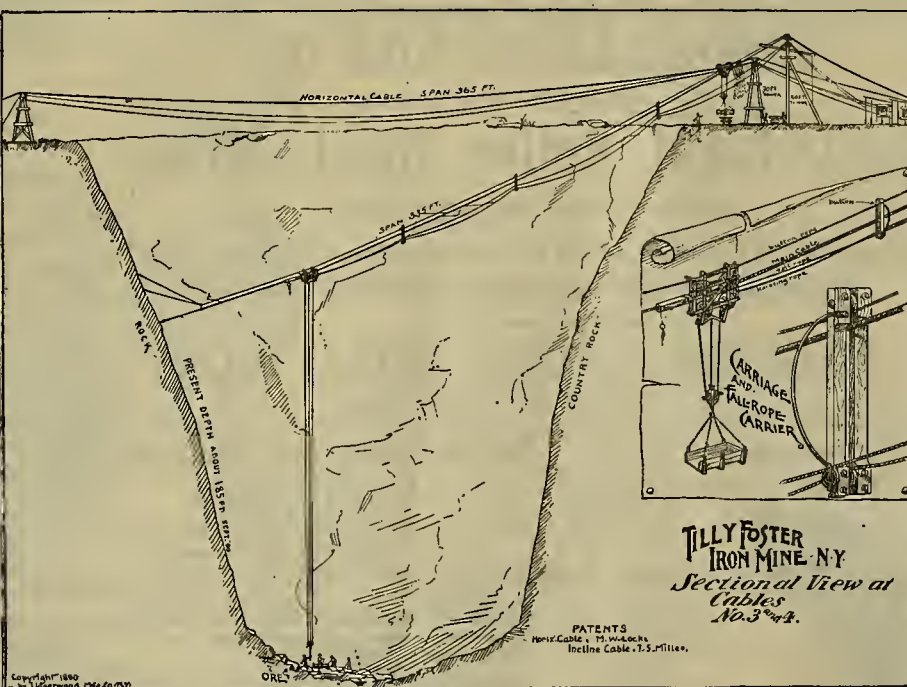
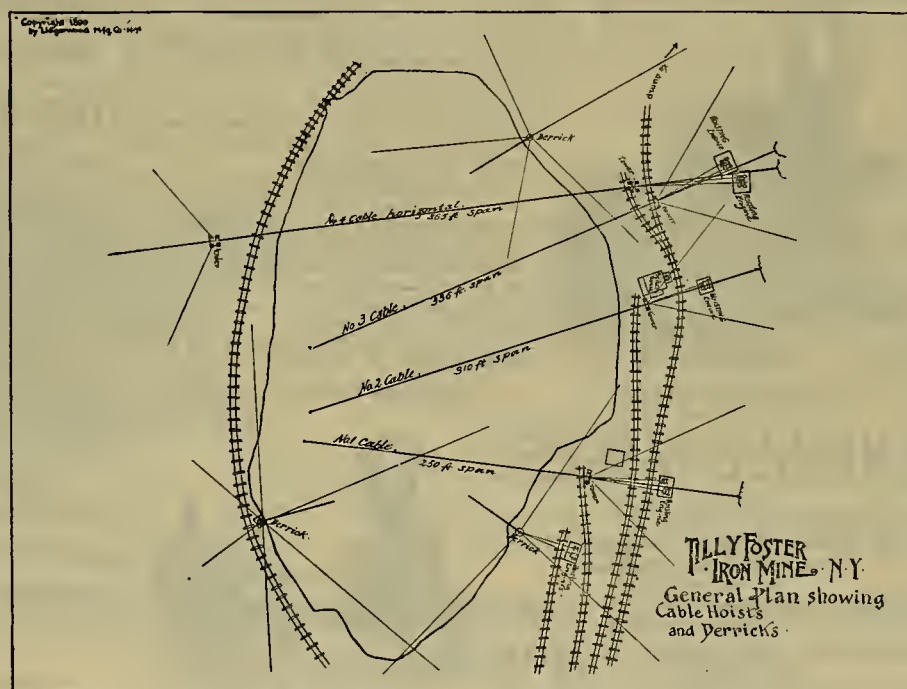
The cables were made by at least three different wire-rope makers. All the cableways, however, are under the patents controlled by the Lidgerwood Manufacturing Company. The illustrations were drawn by one of the Lidgerwood Manufacturing Company's staff of draughtsmen and are copyrighted.

AFTER THE WRONG PARTIES.—The San Francisco Board of Education has determined that the pupils in our public schools shall be punished only on the hand with a leather strap of prescribed weight and dimensions, many tedious preliminaries requiring to be observed before such punishment can be inflicted. Would it not be better to refer this question of punishment to be decided by the big boys in the school? Young America, as being the party most interested, certainly ought to be consulted in an affair of this kind; besides, this would be the most democratic mode of procedure. After all, it

might perhaps be the better plan to whale the teachers and let the pupils go.

LET IT BE ENFORCED!—Now that we have a law prohibiting boys under 18 years of age

from visiting drinking saloons, let the Chief of Police in this city see that it is rigidly enforced. Let the committing magistrate also make sure that offenders brought before him are punished to the full extent of the law.



A Good Time to Renew the Silver Agitation.

It would be thought that the present dearth of gold in England, Germany and Russia would bring the sticklers for monometallism to their senses! These countries have for several months past been heavy importers of gold from the United States, the exigencies of the situation being such that at last accounts they were still cashing for more; and unless something occurs to relieve the stringency of the money market, this metal must soon command a ruinous premium over there.

Formerly, when silver equally with gold circulated as money in these countries, there existed no necessity for such importation of either the white or the yellow metal. Now, with gold as the sole standard of value, there is constant trouble, there not being enough of this metal for the transaction of business, which has been all the while increasing, while the volume of the circulating medium has, through the demonetization of silver, been immensely curtailed. As the amount of business in these countries is constantly being augmented, this comparative scarcity of money must every year be more and more felt, as they do not themselves produce any great amount of the precious metals, nor is the balance of trade largely in their favor.

Under the circumstances, the present would seem to be an opportune time for our Government to renew its proposal for an international conference, for considering the expediency of restoring to silver its former monetary function, instead of continuing it, as at present, a mere commodity, to be bought and sold like any other on the market. While such measure would prove beneficial to all parties interested, it would be of less consequence to this country than any other, we being large producers of the precious metals, and having already adopted a policy nearly equivalent to the free coinage of silver, of which our mines turn out some \$63,000,000 annually.

Of the amount so produced, the General Government purchased every year about fifty-four millions for coinage, leaving only nine millions for consumption in the arts. It appears, then, that we mint and otherwise use up all the silver we produce, wherefore we are not greatly concerned about the enactment of a law establishing its free coinage in the United States.

We are now realizing about all the benefits that would result from the establishment of such a measure, still, if the rehabilitation of silver could everywhere be brought about, it would prove a very desirable movement as tending to settle its status on a satisfactory and permanent basis. And it is in the hope of being able to bring this about that our Government should at this auspicious period seek to co-operate with these European nations to that end.

The demonetization of silver has proved a mistake all around, and we, as the largest producers of that metal, should hasten to repair it. Not that we are suffering from this mistake greatly more than most other peoples, but because, while it is hurting us some, sound policy requires that some general understanding should be reached as to our future dealings with this troublesome question.

THE CORNUCOPIA OF THE WORLD!—A year of plenty awaits us; prosperity smiles over all the hills and plains of California; we are about to gather a rich harvest of fruits and grains and gold, such as has hardly ever in the past brought reward to our people. For weeks the strawberry vines have been yielding abundantly, and now the cherries, large and luscious, are going forward to distant markets. A wide acreage of the cereals shows a good growth generally, the fruit trees almost everywhere being so overburdened that they call for support; the pasturage is luxuriant and the flower gardens are "oppressed with perfume." Peace and abundance dominate the land. Little trouble is in this cornucopia of ours, save the antagonisms between employers and workmen, and for these there is such scant just cause that they ought to meet with speedy removal. The former are the best served and the latter the best paid of any like classes in the world; wherefore, then, this everlasting wrangle? It ought to cease, and would if the wage-earner here could be made to appreciate the many advantages he enjoys over the workmen of most other countries.

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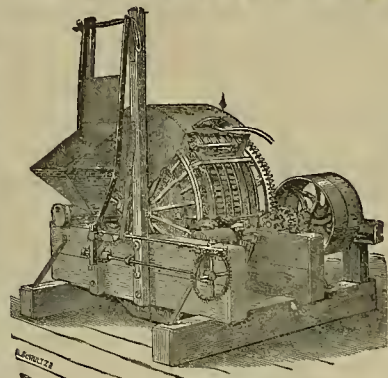
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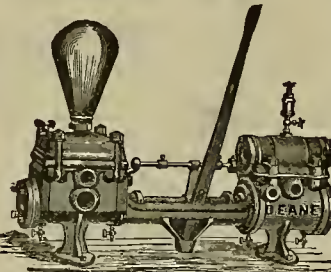
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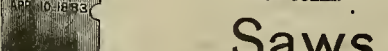
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Stamp Mills for Wet or Dry Crushing. Huntington Centrifugal Quartz Mill. Drying Cylinders. Amalgamating Pans, Settlers, Agitators and Concentrators. Retorts, Bulion and Ingot Moulds, Conveyors, Elevators, Bruckners and Howell's Improved White's Roasting Furnaces, Etc.

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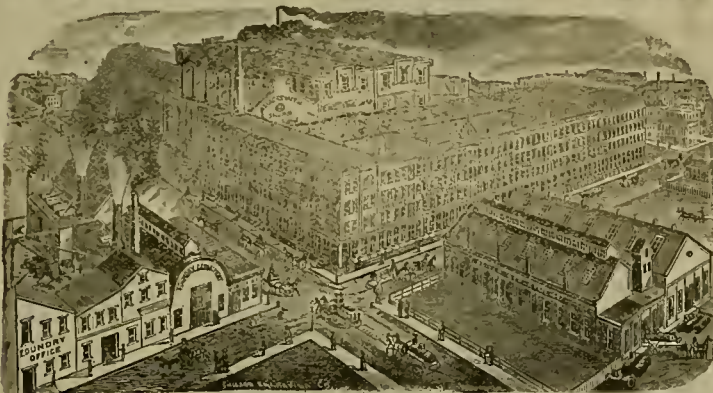
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Blake, Dodge and Comet Crushers, Cornish Crushing and Finishing Rolls, Harz Plunger and Collom Jigs. Frue Vanner & Embrey Concentrators, Evans', Calumet, Collom's and Rillinger's Silme Tables. Trommels, Wire Cloth and Punched Plates. Ore Sample Grinders and Heberle Mills.

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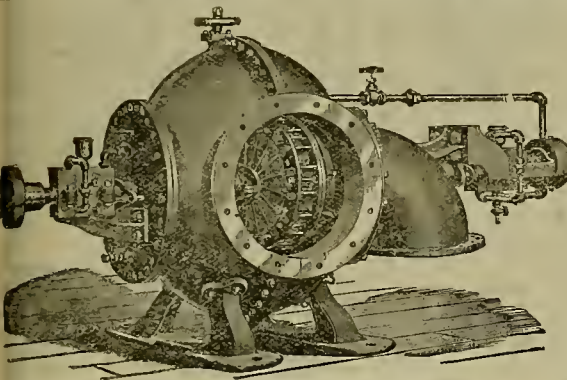
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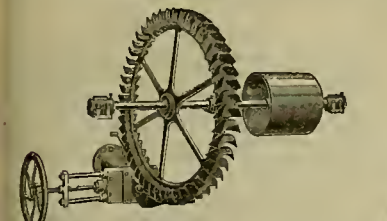
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These Wheels are designed for all purposes where limited quantities of water and high heads are utilized, and are guaranteed to give more power with less water than any other wheel made. Being placed on horizontal shaft, the power is transmitted direct to shafting by belts, dispensing with gearing. Estimates furnished on application for wheels specially built and adapted in capacity to suit any particular case. Further information can be obtained of this form of construction, as well as the ordinary Vertical Turbines for Wooden Penstocks and in Iron Globe Cases, free of cost, by applying to the manufacturers.

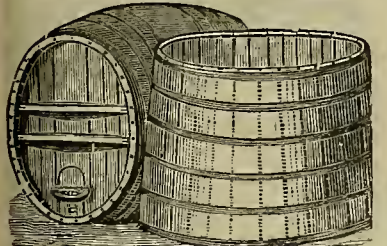
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First Premium Awarded at Mechanics' Fair, 1884. CLOT & MEESSE, Sole Licensed Manufacturers of the MEDART PATENT WROUGHT RIM PULLEY For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of SHAFTING, HANGERS AND APPURTENANCES. SEND FOR CIRCULARS AND PRICE LIST. No. 129 and 131 FREMONT STREET - - - SAN FRANCISCO, CAL.

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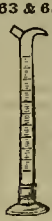
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Ores worked by any Process. Ores Sampled. Assaying in all its Branches. Analyses of Ores, Minerals, Waters, etc. Working Tests (practical) Made. Plans and Specifications furnished for the most suitable Process for Working Ores. Special attention paid to Examination of Mines; Plans and Reports furnished. C. A. LUCKHARDT & CO., (Formerly Huhn & Luckhardt, Mining Engineers and Metallurgists

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Dividend-paying Mines from \$150,000 up. Undeveloped Mines from \$10,000 up. Undeveloped Mines on Bond. Stock in Dividend-paying Mines from \$1 up. Stock in Undeveloped Mines now being opened from 25 cents up.

All situated in the GRASS VALLEY MINING DISTRICT, the Oldest Quartz Mining District on the Pacific Coast, and the Richest and most Permanent in the World. The mines of this district are practically inexhaustible, as nearly half a century of constant working is proof. Grass Valley has the deepest regular dividend-paying gold mines in the world, and the end is not yet, for these same mines are as rich to-day as at any time during their history. Gold mining, especially in Grass Valley, when under honest and scientific management, is one of the safest and most profitable of all American industries. It is a business that will return annually a profit of from 100 to 300 per cent on the investment. Mining is a science acquired only by years of study, combined with practical experience. Therefore, failure is the rule whenever the management is ignorant and unscientific. The undersigned is a practical scientific and successful miner, has made mining a life study and vocation, is honest and trustworthy, and will not, under any circumstances, recommend or deal in any but valuable paying property and properties that will develop dividend-payers. No Wildcat Mines; no Sharp Practice; no reasonable chance for loss; Honesty and Square Dealing Guaranteed. Correspondence solicited. Full particulars by applying to S. B. FOWLER, Supt. Hartery Mine, Grass Valley, Nevada Co., California. DEWEY & CO., PATENT AGENTS, 230 Market St., San Francisco, Elevator, 13 Front St.

MARKET REPORTS.

Local Markets.

SAN FRANCISCO, May 21, 1891.

The past week was characterized by favorable weather for growing cereal crops, but at the close it is turning off warmer which will hasten their maturing, but no bad result will follow unless we have hot north winds before harvest. The prospects for a large wheat crop are sending a larger fleet of vessels to this port than has been on the way at any one time for several years, but we will want them and more besides. The vessels coming will tend to keep the price of coal, iron, etc., down. The local money is fairly easy, but closer working is looked for when the crops begin to move.

MEXICAN DOLLARS—The market is dull at 77@77 1/2c.

QUICKSILVER—Eastern advices report a stronger market, but so far, ours do not respond. This is doubtless due to selling competition. Receipts the past week aggregate 395 flasks. The overland shipments in last month aggregate 810 flasks.

SILVER—Purchases by the Department are reported as follows in this month:

Date.	Offered ounces.	Purchased ounces.	Price paid per ounce.
May 1.....	739,000	350,000	\$.9780 to \$.9840
May 4.....	—	36,000	\$.9850 to \$.9870
May 11.....	—	593,000	\$.98125 to \$.9825
May 18.....	—	144,000	\$.97950 to \$.980
May 18.....	—	315,000	\$.9805 to \$.9830

The purchases by the Mint on Department days are irregularly reported by the associated press, making it difficult to form a correct idea when the monthly quota has been secured. The market is still low, but there is a gradual improving tone which goes far in strengthening the belief with financiers that higher prices will prevail before long. The surplus supply in this country is about exhausted, and as the European money markets are easing, many claim that speculators will draw to silver and to securities based on silver for an investment, which, combined with an increased call from India, will do no little in bringing about better prices. Another thing will have an important bearing on the market, viz.: The stand taken by reform parties in favor of remonetizing silver. This is emphasized by the National Union Convention just held at Cincinnati coming out in favor of the free coinage of silver. It now looks as if Congress this winter will remonetize the metal.

BORAX—Receipts the past week aggregate 498 cts. Shipments overland in last month aggregate 10,314 cts. The market is reported easing but no lower.

LIME—Receipts the past week aggregate 3775 hhls. The market is steady, with a good demand. The low price of lumber is stimulating building.

ANTIMONY—With increasing supplies at the East, New York advices report lower prices, with which our market sympathizes.

TIN—Imports the past week aggregate 3306 ingots from Australia and 1067 bxs. of plate from the East. The market is essentially unchanged. The consumption is enlarging. On July 1st the increased duty on plate goes into effect, and as iron and steel appear to have touched bottom, higher prices are certain to rule for plate, but pig tin will probably go lower as the duty on it will not go into effect for about two years yet, and in the manufacture of plate less than five per cent of tin is used, the rest (over 95 per cent) being either iron or steel.

LEAD—The local market is unchanged. At the East the market is reported steadier.

COPPER—The market continues weak. The Iron Age reports the New York market as follows: Consumption shows no sign of improvement, but production continues on a large scale, and it is no secret that there is considerable accumulation of stock at first hands that has more or less weight, despite the assumed indifference of the representatives of the chief producers. Export outlet, except for furnace material, is very narrow. Home consumers buy only as imperative wants necessitate, and the latter are neither extensive nor urgent. At 13 1/2c there seems to be more Lake Superior ingot available than an outlet for can be found at the present time. Arizona Ingot at 12 1/2c, is virtually a drug upon the market, and bids of 1/2c to 3/4c less for round lots would probably not go begging. On common casting brands anything above 11 1/2c is exceptionally high at the present time.

IRON—The market continues weak under liberal spot and to arrive stocks. English and Eastern advices are favorable to better prices.

COAL—Imports the past week aggregate as follows: Nagasaki, 3250 tons; Coos Bay, 450; Departure Bay, 2400; Tacoma, 4000; Seattle, 2250. Total, 12,350 tons. Increased offerings are reported for prompt and early shipments from Europe, the East and Australia. This is due to our large grain crop attracting to us more vessels, and they prefer bringing coal to coming empty. The spot market is easy with some kinds quoted lower.

COKE—Spot parcels are on the market at concessions. Consumers buy sparingly.

Coal and Coke.

SPOT FROM YARD—PER TON.	TO LOAD—PER TON.
Wellington.....\$10 00	Australian.....7 00 @
Ore.....5 50	Liverpool S.M.....7 00 @
Carbon Hill.....8 00	Scotch Splint.....7 00 @ 9 00
Nanaimo.....10 00	Cardiff.....7 00 @
Gilman.....7 50	Lehigh Lump.....14 00 @ 17 00
Seattle.....7 50	Cumberland bk 10 00 @
Coos Bay.....6 00	Egg, hard.....12 00 @
Cannel.....9 50	West Hartley.....7 50 @
Egg, hard.....14 00	
Cumberland, in sacks 14 00	
do, bulk.....13 00	
Wallend.....9 00	Coke—English.
Scotch Splint.....8 50	
Rymbo.....8 50	To load.....\$12 00 @ 13 00
West Hartley.....8 50	Spot, in bulk.....14 00 @ 16 00

PERMANENT INSTITUTIONS.—There are many things that we in San Francisco are compelled to do without, but Dennis Kearney and the poor we always have with us, Dennis having lately returned from the East to stay.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING MAY 12, 1891.

- 452,333.—STREET RAILWAY RAIL AND PAYMENT—P. Bargion, S. F.
- 452,174.—GAS ENGINE ATTACHMENT—M. M. Barrett, S. F.
- 452,023.—DRAIN PIPE FOR BUILDINGS—J. L. Crittenden, Oakland, Cal.
- 452,102.—FRUIT-PICKER—Amalea Fogeli, Nevada City, Cal.
- 452,223.—HOUSE DOOR LETTER BOX—Emma C. Hudson, Seattle, Wash.
- 452,184.—POWER STREET PAVING MACHINE—F. A. Huntington, Oakland, Cal.
- 452,106.—WEATHER STRIP—A. La Jeunesse, Alameda, Cal.
- 452,233.—CLOTHES DRIER—J. McKinnin, Spokane Falls, Wash.
- 452,348.—BEDSTEAD TABLET—C. H. Murray, Portland, Or.
- 451,949.—SAFETY GRIP BRAKE FOR CABLE CARS—C. E. Naylor, S. F.
- 452,283.—HYDRAULIC AIR COMPRESSOR—W. R. Phillips, Seattle, Wash.
- 452,112.—RAZOR STROP—M. E. Reilly, Montezuma, Wash.
- 452,284.—DRIVING CALK—M. E. Reilly, Montezuma, Wash.
- 452,084.—DOOR MANIPULATOR—F. Schmitz, S. F.
- 452,091.—TREATING CONDUCTORS—J. B. Williams, Oakland, Cal.

The following brief list, by telegraph, for May 19 will appear more complete upon receipt of mail advices:

California—Ulrich Bachmann, San Francisco: apparatus for impregnating liquid with gas; Conrad Beyer, San Francisco: folding bed; Charles H. Coffin, San Francisco: three-wheeled vehicle; Charles C. Davis, Los Angeles: portable burglar alarm; Henry N. Elliott and E. L. Bemis, Los Angeles: suspender; William R. Finch, Eureka: breech-loading gun; Adam W. Gilfillan, steam boiler alarm; August Harding, Oakland: explosive engine; Charles P. Harris, San Francisco: game puzzle; Mary C. C. Hartman, Redding, steamer; Byron Jennings, San Jose: assignor of one-half to J. Brusie, Oakland, electric insulator; Byron Jennings, assignor of one-half to J. Brusie, Oakland, insulator holder for electric railway; Joseph F. McElroy, assignor of one-fourth to J. T. Delaney, San Francisco, desk and seat support; William A. McFarlane and S. A. Barrett, San Bernardino, water gauge; Austin D. Moore and A. K. Green, San Francisco, faucet; J. J. Pieter, San Francisco, athletes' supporter; George H. Tietjen, San Francisco, stencilizing machine; Walter R. Webster, Pine Grove, closing device for water-closet lid; Walter R. Webster, Pine Grove, spring hinge; Joseph S. Whitcomb, San Francisco, excavating apparatus; Alfred L. White and D. L. Miller, Sulsum, automatic pumping apparatus; James B. Williams, Oakland, insulated electric conductor; John J. Spelker, Sacramento, remedy for rheumatism, neuralgia and headache.

Oregon—Frank Vatter, Marshfield, apparatus for preserving piles.

Washington—Edward W. Mitchell, Spokane Falls, assignor of one-fourth to R. Parker, J. H. Stearns and B. F. Sutton, Brooklyn, N. Y., conductor for electric railways.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

FRUIT PICKER.—Amalea Fogeli of Nevada City, California, No. 452,102. Dated May 12, 1891. This device consists of a disk having a circle of upwardly extending pins about its periphery, the pins being separated and forming with the disk an open walled receptacle. A handle projects downwardly from the disk and is joined by a hinge, which is controlled by a latch. The picker is used by raising the disk up to the fruit, and passing any of its pins on each side of the fruit stem, the fruit itself resting on the disk. Then a slight turn or twist is given which breaks the stem, thus leaving the fruit uninjured in the receptacle. When full, the latch is operated and the jointed handle bends, whereby the receptacle may be turned to an angle to safely discharge its contents.

DOOR-MANIPULATORS.—Franz Schmitz of S. F., Cal. No. 452,084. Dated May 12, 1891. This invention belongs to the class of door openers and closers by which the door may be manipulated from a distance. It consists principally of a peculiar swiveled pulley secured to the door jamb for directing the cord which is attached to the door. The pulley turns to any angle to accommodate the different directions of the cord, according to the degree to which the door is opened, and it thereby prevents any cramping or hindering of cord. The device further consists in a single lever with suitable connections, for opening and closing the door.

Eastern Metal Markets.

By Telegraph. NEW YORK, May 21.—The following are the closing prices the past week: Silver to Silver in London. New York. Copper. Lead. Tin. Thursday..... 97 1/2 13 62 4 2 1/2 20 45 Friday..... 97 1/2 13 62 4 2 1/2 20 45 Saturday..... 97 1/2 13 60 4 2 1/2 20 45 Monday..... 97 1/2 13 50 4 2 1/2 20 45 Tuesday..... 97 1/2 13 50 4 2 1/2 20 45 Wednesday..... 97 1/2 13 50 4 2 1/2 20 45

Borax is weak under heavier supplies. Quicksilver is stronger. Tin is firmer. Lead is strongly held, but buyers are offish. Copper continues unsatisfactory.

PULVERIZER AND CONCENTRATOR.—Attention is called to the advertisement in another column of the "Common Sense Pulverizer and Concentrator." Mr. S. K. Snodgrass, the inventor, has had much practical experience as a miner and seems to have made liberal application of the principle as well as name by which his pulverizer is known. Many letters from those who have tested the machines by actual work bear ample testimony to the satisfaction it has given. Circulars and all particulars will be sent upon application to S. K. Snodgrass, 220 Sutter St., room 13, S. F.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

ASSESSMENTS.							
COMPANY AND LOCATION.	No. AMT.	LEVIED, DELINQ. AND SALE.	SECRETARY.	PLACE OF BUSINESS.			
Andes M Co., Nevada.....	37.....	800.....	Apr 4, May 8, May 28.....	J W Twiggs..... 369 Montgomery St.			
Caledonia S M Co., Nevada.....	44.....	150.....	May 2, June 4, July 5.....	A S Groth..... 414 California St.			
California Iron & Steel Co., California.....	5.....	350.....	Apr 17, June 6, June 27.....	F Bonacina..... 438 California St.			
Carmelo Land & Coal Co., California.....	3.....	500.....	Apr 11, May 16, June 16.....	W T Baggett..... 346 Pine St.			
Chollar M Co., Nevada.....	29.....	500.....	Apr 6, May 13, June 2.....	C E Elliott..... 309 Montgomery St.			
Com Imperial M Co., Nevada.....	31.....	50.....	May 6, June 11, July 1.....	C L McCoy..... 331 Pine St.			
Cons New York M Co., Nevada.....	5.....	150.....	Apr 3, May 8, May 29.....	C E Elliott..... 309 Montgomery St.			
East Sierra Nevada M Co. Co. Nevada.....	2.....	50.....	Apr 14, May 22, June 15.....	G R Spinner..... 309 Montgomery St.			
Gray Eagle M Co., California.....	23.....	30.....	Apr 3, May 18, June 9.....	A W Barrowe..... 303 California St.			
Guanacaran & Cal M & Co., Honduras.....	5.....	500.....	May 12, June 17, July 6.....	Edward Cliver..... Montgomery Avenue			
Idelwild M Co., California.....	2.....	100.....	May 1, June 1, June 29.....	E F Stone..... 306 Pine St.			
Indian Creek L & M Co., California.....	2.....	60.....	Apr 7, May 11, June 1.....	S O Mills..... 309 Pine St.			
Live Marble Co., California.....	12.....	100.....	Mar 30, May 12, May 29.....	W Luce..... 132 California St.			
Kentuck Cons M Co., Nevada.....	1.....	40.....	Mar 31, May 6, May 25.....	J W Pew..... 310 Pine St.			
Lido Oak Drift Gravel M Co., Cal.....	13.....	20.....	Apr 15, June 2, June 22.....	Joa Morizio..... 328 Montgomery St.			
Midas M Co., California.....	2.....	100.....	Apr 27, May 28, June 29.....	A Halsey..... 328 Montgomery St.			
Mineral King M Co., Arizona.....	6.....	100.....	Mar 23, Apr 23, May 18.....	T P Norman..... 419 California St.			
N Bloomfield Gravel M Co., California.....	47.....	250.....	Mar 26, May 4, May 27.....	H Picholt..... 329 Sansone St.			
Oak Cons M Co., California.....	5.....	40.....	Apr 6, May 13, June 19.....	E J Ryan..... 329 Montgomery St.			
Peerless M Co., Arizona.....	10.....	100.....	Apr 24, May 29, June 18.....	A Waterman..... 309 Montgomery St.			
Silver Hill M Co., Nevada.....	28.....	200.....	Apr 23, May 28, June 18.....	D C Bates..... 309 Montgomery St.			
Scorpion S M Co., Nevada.....	26.....	150.....	Apr 14, May 22, June 15.....	G R Spinney..... 310 Pine St.			
Sierra Nevada S M Co. Nevada.....	93.....	100.....	May 13, June 17, July 7.....	E L Parker..... 309 Montgomery St.			
Sylvania M Co., Nevada.....	2.....	81.50.....	Apr 27, May 28, June 29.....	J J Scott..... 309 Montgomery St.			
Union Cons M Co., Nevada.....	43.....	30.....	May 11, Apr 28, May 28.....	W Barrowe..... 4 Sn ter St.			
Utah Cons M Co., Nevada.....	12.....	250.....	May 6, June 12, June 30.....	A H Fish..... 369 Montgomery St.			
Valley View M Co., California.....	2.....	20.....	Apr 13, May 18, June 8.....	T W Gurnett..... 308 Pine St.			
Yellow Jacket M Co., Nevada.....	48.....	500.....	Apr 14, May 16, June 20.....	W H Blauvelt..... Gold Hill			
MEETINGS TO BE HELD.							
COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.			
Alaska Treadwell G M Co.....	A T Corbin.....	420 Montgomery St.	Annual.....	June 13			
Calistoga T M Co.....	H S Kirby.....	331 Pine St.	Annual.....	June 1			
Caledonia G M Co.....	A Cheminant.....	328 Montgomery St.	Annual.....	June 2			
Central Coast Coal Land & Gravel Co., California.....	A Cheminant.....	328 Montgomery St.	Annual.....	May 26			
Clara M Co.....	A Cheminant.....	338 Montgomery St.	Annual.....	June 1			
Crown Point M Co., Nevada.....	J Newlands.....	329 Pine St.	Annual.....	June 1			
Pinal Cons M Co.....	A Cheminant.....	328 Montgomery St.	Annual.....	June 1			
Silver Hill M Co., Nevada.....	D C Bates.....	309 Montgomery St.	Annual.....	May 25			
LATEST DIVIDENDS—WITHIN THREE MONTHS.							
COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.			
Champion M Co.....	T Wetzel.....	320 Sansome St.	10.....	May 18			
North Star M Co., California.....	A Hough.....	328 Montgomery St.	50.....	Apr 30			
North Star M Co., California.....	D A Jennings.....	401 California St.	50.....	Apr 30			
Pacific Coast Borax Co., California.....	A H Hough.....	230 Montgomery St.	1 00.....	May 1			

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Alaska Treadwell G M Co.....	A T Corbin.....	420 Montgomery St.	Annual.....	June 13
Calistoga Cons M Co.....	H S Fitch.....	331 Pine St.	Annual.....	June 1
Caledonia G M Co.....	A Chemant.....	323 Montgomery St.	Annual.....	June 2
Cardonide Coal Land & Imp't Co.....	L A Kelley.....	323 Montgomery St.	Special.....	May 26
Chollar M Co., Nevada.....	C E Elliott.....	309 Montgomery St.	Annual.....	June 1
Crown Point M Co., Nevada.....	J Newlands.....	323 Pine St.	Annual.....	June 1
Pinal Cons M Co.....	A Chemant.....	323 Montgomery St.	Annual.....	June 1
Silver Hill M Co., Nevada.....	D C Bates.....	309 Montgomery St.	Annual.....	May 26

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M Co.....	T Wetzel.....	329 Sansone St.	10.....	May 18
North Banner Cons M Co., California.....	T J Mitchell.....	700 Grassy Valley.	50.....	Apr 20
North Star M Co., California.....	D A Jennings.....	401 California St.	50.....	Apr 8
Pacific Coast Borax Co., California.....	A H Clough.....	330 Montgomery St.	1 00.....	May 11

Table of Lowest and Highest Sales in San Francisco Stock Exchange.

NAME OF COMPANY.	WEEK ENDING APR. 30.	WEEK ENDING MAY 7.	WEEK ENDING MAY 14.	WEEK ENDING MAY 21.
Alpha.....	1.25 1.35	1.20 1.50	1.25 1.50	1.00 1.35
Andes.....	1.35 1.55	1.40 1.75	1.45 1.75	1.30 1.60
Andes.....	1.35 1.55	1.40 1.75	1.45 1.75	1.30 1.60
Andes.....	1.35 1.55	1.40 1.75	1.45 1.75	1.30 1.60
Andes.....	1.35 1.55	1.40 1.75	1.45 1.75	1.30 1.60

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

- GEO. WILSON—Sacramento, Cal.
- J. C. HOAG—San Francisco.
- F. W. KRAFF—Amador Co.
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GRAY EAGLE MINING COMPANY—Location of principal place of business, San Francisco, California. Location of works, Placer county, California. Notice—There are delinquent upon the following described stock, on account of Assessment (No 23) levied on the 31 day of April, 1891, the several amounts set opposite the names of the respective shareholders, as follows:

Name.	No. Shares.	Amount.
Barrowe, A W, Trustee.....	547	1,000 \$30 00
".....	559	1,000 30 00
".....	562	500 15 00
".....	563	500 15 00
".....	568	1,000 30 00
".....	569	1,000 30 00
".....	570	500 15 00
".....	575	500 15 00
Bogart, C H, Trustee.....	424	650 19 50
".....	473	214 6 42
".....	493	105 3 15
Buffington, J M, Trustee.....	495	500 15 00
Noroman, Leon.....	514	100 3 00
Rosekrans, H M.....	634	600 18 00
Rickard, J H, Trustee.....	634	600 18 00
Stout, C S, Trustee.....	478	2,000 60 00
".....	477	853 25 50
Taylor, J N, Trustee.....	532	1,040 31 20

And in accordance with law, and an order of the Board of Directors, made on the 8d day of April, 1891, so many shares of each parcel of such stock as may be necessary, will be sold at public auction, at the office of the Company, Room 11, No. 308 California street, San Francisco, California, on TUESDAY, the 9th day of May, 1891, at the hour of one (1) o'clock P. M. of said day, pay said delinquent assessment thereon, together with costs of advertising and expenses of sale.

A. W. BARROWE, Secretary pro tem.

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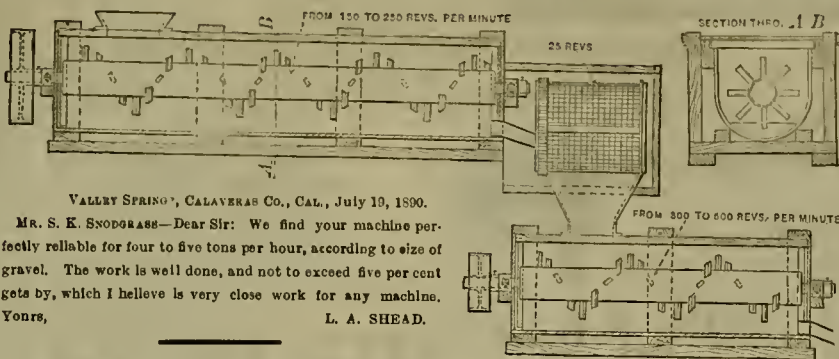
MINES and Stock in Mines for sale. See advertisement on page 321.

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S. K. SNODGRASS, Esq.—Dear Sir: In regard to the work done by your machine, which we have had in operation for the past three months, I can say that it has handled successfully all material as taken out of our ground, the only cement which was not perfectly broken up being an exceedingly hard cemented material approaching rock in its hardness. For all free wash and moderately hard cement it will do very good work, and must effect a great saving in working such gravels and cements, owing to the small head of water required; and furthermore, its great gold-saving qualities, as I am satisfied that fully 95 to 98 per cent of the gold freed in the machine is saved, even to flour gold, and that too without the use of quicksilver. The automatic rejection of all rocks and material by the revolving screen makes the handling of the gravel cheaper, as all hand culling of the material is rendered unnecessary. Truly yours, W. W. B. STEVENS.

S. K. SNODGRASS, 220 Sutter Street, San Francisco.

Mining Share Market.

The week under review exhibited some of the old time life, with Con. Virginia the leader. This stock jumped from a little over \$16, closing on Wednesday to over \$20 the next day (Thursday), and on Monday afternoon sold as low as \$9.50 a share on Call, and \$9 after Call. The movements in this stock caused the remainder of the list to move in sympathy. The sharp up was brought about by sedulously circulated reports that the Jones (who are said to be insiders) had, after Samuel looked at the Con. Virginia mine, filled their shorts. This report and the sharp up had the desired effect of making nearly all outsiders who had shortened the market fill at a heavy loss, after which the pool sent prices down so fast as to swoop in big lines of stocks carried for outsiders by brokers. The only stop was when Con. Virginia touched \$14 at which figure the points were out to buy all along the line for something big. Large numbers acted on the advice and the something big was a big break, which broke about all who had put their heads in the lion's mouth by buying more than they could pay for. Brokers to protect themselves had to throw stock on the market without warning. This paper has repeatedly stated that when top prices were reached there would be a break of from 50 to 60 per cent. This was sufficient to keep many patrons from overbuying, and they made money by it. We will say now that the next break will be larger than the one just witnessed, but before it comes we are liable to have many setbacks. Insiders want certain stocks, and the stocks wanted they must have, and it is only by wide fluctuations they can get there. The mines are looking too well to let others reap the profits when they are compelled which will undoubtedly be done, to work the mines as required by the laws of this State, and when that time comes many dummy directors and officers will be made to disgorge, but it will be hard to reach those in the background and for whom the dummies work, but then those who rake nuts out of the fire for others to eat should be hurt.

In outside stocks the market has been dull at lower prices. The stocks are being concentrated for a bull campaign this summer.

From the Comstock mines our advices are of a still more encouraging character. Attention is being drawn by cappers and their friends to the 1100-foot level of Con. Virginia. The PRESS has said and will state again that it is not on that level the important work is being done; it is on the 1750-foot level. To reach the downward continuation of the very rich ore found on the 800-foot level, they will have to run on the 1100-foot level over 300 feet farther west from the point they are now reported to be at work. On the lower level (1750) the ore is rich, it is the same that was reported officially by Hon. James G. Fair, when superintendent of the mine. He gave its downward continuation from several levels above the 1750 foot. The ore has never been taken out. In Ophir they are pushing work to more fully develop the rich ore found to the west on the 1465-foot level. From Union and Sierra Nevada good reports can be expected any day. In the Middle group of mines the work is of a very important character. In the Gold Hill mines the dead work is about all over, although points are out that nothing can be expected from them until the water is pumped out, which evidently means until insiders get all the stock they want. Yellow Jacket is extracting gold-bearing quartz for reduction. Work in the Alta group is being favorably prosecuted.

Complimentary Samples.

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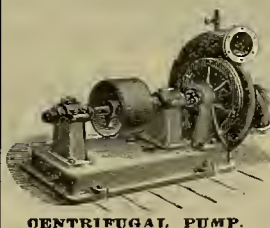
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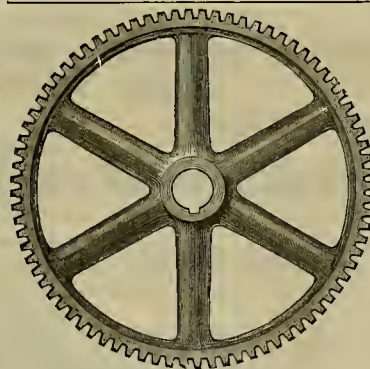
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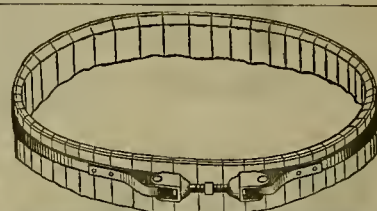
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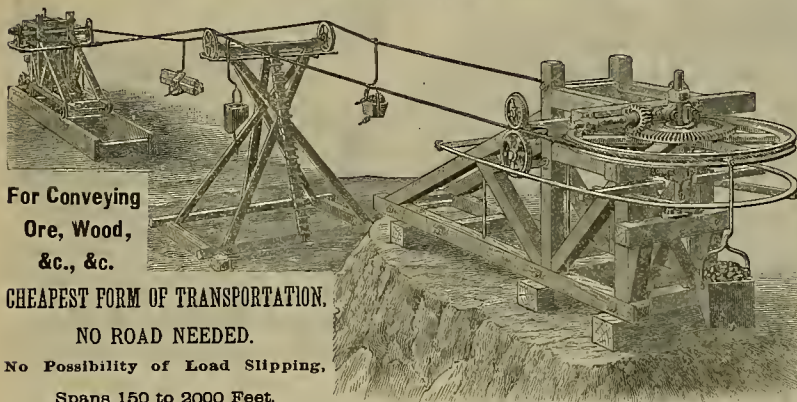
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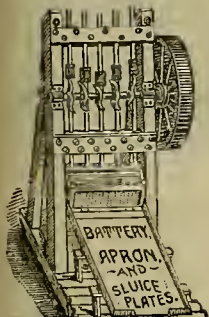
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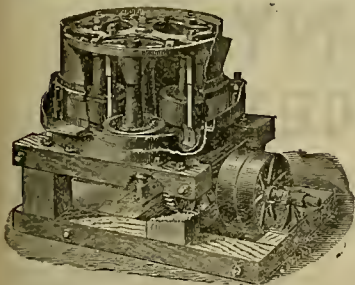
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One (1) 10" x 36" Retort and Furnace.

One (1) Complete Assay Outfit.

One (1) Complete Outfit for a 2½-ton capacity chlorination Works.

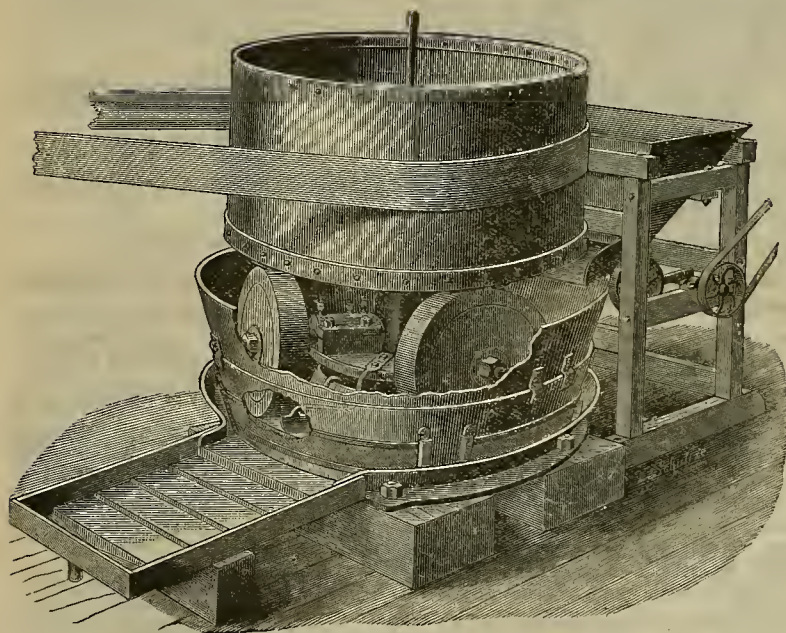
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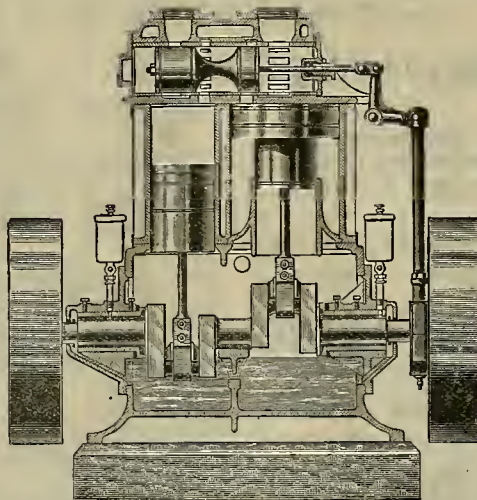
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JUNIOR, 166 ENGINES, 4260 HORSE POWER.

Grand Total, 309 Engines, Aggregating 13,975 Horse Power.

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MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXII.—Number 22.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, MAY 30, 1891.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

The Tierra Seca Gold-Extracting Machines.

The numerous localities in different parts of the world, where the necessary supply of water is not obtainable, or at best, intermittent, has led to many inventions, looking not only to the dry washing of gold, but to the separation of other metals from their matrix. Fig. 1 represents a dry prospecting machine, which can be made to weigh only six pounds, while Fig. 2 represents a dry concentrator, built in two sizes, weighing 350 and 600 pounds, respectively. They are the invention of Mr. Chas. Wetziar, and have attracted considerable attention. The bed of machine represented in Fig. 1 has a series of bars one-sixteenth inch in diameter, laid transversely to its length, the bars making a riffle three-fourths inch wide at the top, the others being placed one-half inch apart to the bottom end of the bed, forming a series of riffles.

The bed fits into an inclined groove, on each side of machine, the top end coming directly under the hopper *c*; the frame is made air tight except through the gauge forming the bottom of machine. The sides of the feed hoppers are formed by the sides of fan *a*, the body of which forms the back end, while the front end is a

movable sheet of iron, which slides in grooves out in the side, regulating the size of the opening on to the ore bed, according to the material to be treated. The powdered material is fed into the boppers, the fan started, and the feed opened to the required extent. As the material traverses the ore bed the light particles float away, leaving the metal on the bed.

Dry Concentrator.

The dry concentrator shown by Fig. 2 uses the method of introducing the material to be concentrated into a box, through which flows an intermittent current of air. This rising through a sieve in motion, sustaining a layer of shot, carries away the lighter gangue, the heavier particles, falling by gravity among the shot, sink through a sieve into a suitable discharge.

As will be noted there are seven parts to the machine: The feed hopper 1; the shot box 2; the main shaft 3; the Archimedeian screw for ejecting tailings 4; the exhaust fan 5; the exhaust regulating tappet valve 6; and the exhaust regulating slides 7.

Attached to the main shaft, there is a belt pulley to drive pulley of the fan; also a belt for driving the spindle of the tappet for the regulating tappet valve, and a step cone pulley for driving the Archimedeian screw at varying speeds. The No. 1 machine is said to require but $\frac{1}{2}$ of 1

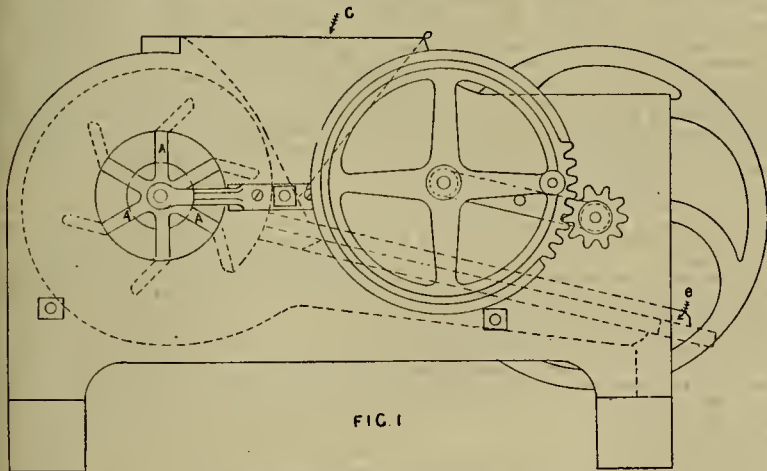


FIG. 1

DRY PROSPECTING MACHINE.

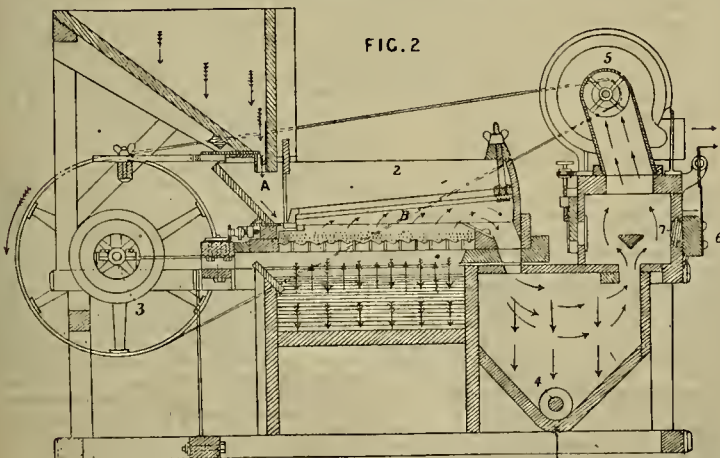
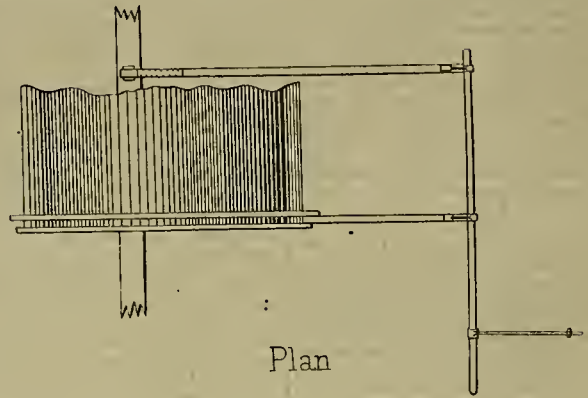
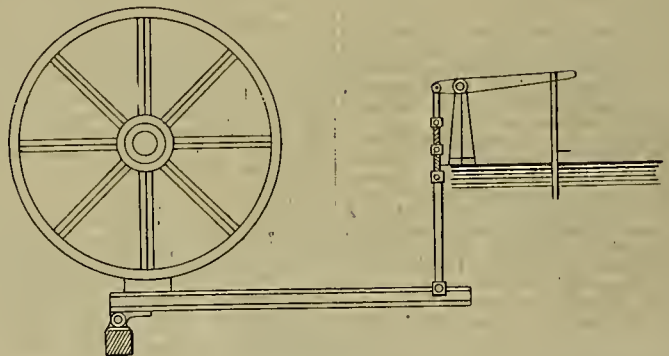


FIG. 2

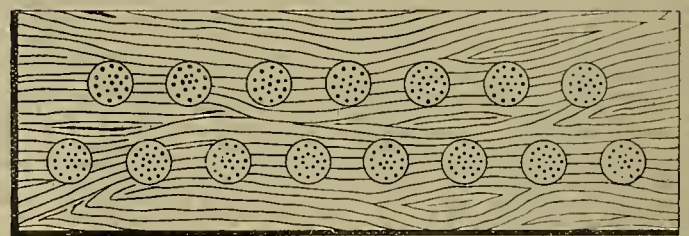
DRY CONCENTRATOR.



Plan



Elevation



Timber Block for Brake

BRAKE USED IN DEEP MINING.

horse-power to drive it, and to have a working capacity per day of from four to seven tons. The No. 2 machine requires $\frac{3}{4}$ of 1 horse-driving power, and has a capacity of 20 to 30 tons per day.

Burns' Brake.

Connected with haulage in deep mines, the importance of having efficient brake power is indisputable, particularly where winding is done with a single rope. In the one presented on this page, we show an invention, patented by Mr. T. Burns, engineer at the Bickenshaw collieries. Mr. Burns contends that with his brake, there is less first cost, and less cost in working than with the ordinary foot brake and steam brake with straps passing at least half around the drum ring.

He uses no steam, the brake being worked without any undue exertion by the engineer, and is so constructed that either an enormous

force, or a very slight one can be put on without any sudden jerk.

It is claimed that these brakes will easily give a leverage of 200 to 1, affording a retard-log force of five tons, and that a separate brake can be attached to each brake ring, thus multiplying the power to any extent. By means of adjusting screws, the brake can be tightened or slackened by the engineer in a few seconds, without leaving the engine-house, the handles being adapted to any position desired.

The new railroad to Anaconda will be three and one-half miles shorter than the old one. The Butte depot will be within three minutes walk from the courthouse, and the Anaconda depot at the head of Main street in that city. The connection with the mines of the company will be easy, the question of grades having been rendered simple by the enormous power of the engines now available for such work.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—Eds.

Notes From Sonora Mexico.

EDITOR PRESS:—The St. Helena gold mine at Las Delicias on the Sonora river is now running its business steadily, its 60-stamp mill is being constantly in operation running partly on tailings of which many thousands tons are banked from former years, and partly on ore extracted from the mine. The tank process is being used, the Boss continuous having been discarded. It is pleasant to know that this business so important to this part of Sonora is once more in activity after so many shut-downs for one cause or another. Capt. L. W. Mix formerly of San Francisco is the General Manager, and a large force of American mechanics and Mexican laborers is employed constantly. A new electric light plant was inaugurated on the beginning of last week, and as I understand successfully.

Messrs. Magruder & Fresh, who have been long identified with mining interest in this State, have lately commenced at a place commonly known as the Carbonera, the running of a 5-stamp mill on gold ore extracted from a mine near by. This mill is an old one and was erected by Tucker & Hardwick several years ago, but proved unsuccessful because they were unable to treat the ore. The mill having been reconstructed and new machinery added the above trouble has been obviated. In place of amalgamating in the battery and on plates a Cook Amalgamator is now being used and with good results. Mr. Fresh is in charge of the business, and Mr. Magruder continues to operate the Yeco mines and mill at Las Cruces. The Gavilan mines which at one time were supposed to be sold to an English syndicate for £40,000 were not disposed of, owing to some hitch in the negotiations with Mr. Martin. These mines have since been examined by an Eastern expert in the interest of Boston people, and a very favorable report made thereon if rumor can be believed. The owners confidently expect that the business may start up with capital sufficient to make a success of the property.

There has been a large influx of natives into the "Oro Negro" camp from the surrounding country, owing to the fact of the great activity of the above company. Their mines are rich, and as they have worlds of ore in sight, are being operated very successfully.

A late letter from the camp at the Sierra de Lopez, the location of the Popocatepetl mine, owned by Don Rafael Fort & Co., says that their stamp-mill is nearly ready for starting, and the property is looking splendidly. A great success is anticipated for the enterprise.

At Minas Prietas, the old mill, I believe, is running steadily on tailings. Price's mill is running days only, the water supply being short. He is making strenuous efforts to increase the supply, from a spring named "El Chivato."

The placers near Fronteras, to which many hurried some months ago, have, like many such schemes, had their boom, and are now having their collapse. It has been a case of "much cry and little wool." That there is gold in small quantities in the district, near Bacochi and Fronteras, is evidenced by the amount of work done by the "Antignos." I have seen hesitating nuggets from near the former place.

Mining business just now is looking up here, and several parties are seeking after good properties. Mr. Jeff Bickerton, from the Tohachi mine near Campas, is making regular shipments of rich ore to the United States, and is doing fairly well, although freight to Sonora R. R. costs him very heavily, owing to the great distance he has to transport his metal.

It is said that the city of Ures is to be lighted by electricity shortly, through the public spirit of that friend to Americans in his vicinity, Don Francisco C. Aguilera, ex-Prefect of the Ures district.

The skies are clouding up this summer, and it looks as though rains would be early. Yesterday there was some thunder, and on May 4th a slight earthquake shock was experienced, reminding one of the 3d of May four years ago, when the earth trembled perceptibly and soared many. Flour has been extremely high here lately, but now a new crop of wheat is about being harvested, insuring a fall in prices.

"AMERICANO."

Hermosillo, May 10, 1891.

Letter from Arizona.

EDITORS PRESS:—I had calculated to send you another communication from Oro Blanco district before now, but owing to circumstances over which I had no control I have been prevented doing so. However, I proceed to describe the workings on the different claims lying easterly from the Yellow Jacket lode and mine.

The Border mine, which has a number of shafts and tunnels of short lengths and depths, shows good ore everywhere. The main, or new shaft, now down some 30 feet, shows a ledge the full width of the shaft and no walls. There are now 20 tons of ore on the dump awaiting shipment by burro train to the Con. Arizona mill. This is termed second-class ore, the first-class being sold to Salazar, the pre-

mier at Nogales. I learn from good authority that the last-named ore produces from 100 to 200 ounces silver per ton, while the second grade may run from 75 to 80. Four men are working in this mine and development work is progressing proportionately.

Since my former article a large body of high-grade ore has been discovered in the Montana mine, and the party, J. W. Bogan & Co., who hold a two-years' lease thereon, are elated over the fact, as they have in the Montana a veritable bonanza.

The main tunnel is now in 300 feet or more and onto the mountain at this point 130 feet below the surface.

Several crosscuts show at different places in this tunnel a body of ore 30 feet wide. The higher grade of this ore is soaked and shipped to El Paso yielding, I am informed, an average of 60 ounces silver and 40 per cent lead per ton. Of this class there are several feet and the lower grade is first concentrated at the Con. Arizona mill and then shipped to El Paso. There are employed here eight or ten men in the mine, and a number outside filling sacks and loading wagons. A new wagon-road has been built to the mine giving the company cheaper transportation for their ore and more rest to the former heavy-laden burros.

The Peeltick, Manyana, China mine and several other locations on this lode near the Montana are promising-looking claims, but as yet show no development work of importance, simply for want of the necessary capital to do so.

The Austertiltz contains three shafts—one 60 feet one 40 and one 30 feet deep. The 60-foot or main shaft has a drift along the ledge 40 feet in length, at the end of which there is a crosscut showing over five feet of gold ore, yielding \$15 per ton by mill test. The upper or 40 foot shaft shows 2½ feet ore, averaging in gold \$25 per ton. Shaft No. 3, same size and same grade of ore as the 40-foot shaft. Ore from the drift along the ledge at bottom of mountain, 25 feet in length, assays from \$20 to \$60 per ton in gold, with a few ounces in silver. The average mill test of the 400 tons taken from the various workings on this claim was: Gold, \$14; silver 12 ounces per ton. The Forsaken, Continuation and a few other locations in the vicinity of the above mine cover large surface deposits; not sufficiently worked, however, to tell much of their probable worth.

The Ragnarok is virtually a mountain of ore, the lode here carrying more silver than gold. Several openings in various parts of this claim show ore everywhere, and although 150 tons have been taken out for milling purposes, hundreds of tons yet remain on the dumps, there being thousands of tons left in sight. The same story, as regards development, can here be told, viz.: Cash to work it.

But one may say, with so much ore easily gotten out, why not quarry it out and have it milled? In reply, I give the reason as above. There is but one 10-stamp mill in operation (excepting the Yellow Jacket of 20 stamps) in these parts, and they hold to a milling price of \$22 per ton for milling the ore, and guarantee no account of battery samples, and this, together with say \$3 per ton for packing to mill, leaves no return for the miner.

There is no doubt but this ore will average \$30 per ton, it being the most free milling of all ores in Oro Blanco district. Yet even should the mill-owner guarantee 80 per cent of this, with the enormous price charged for milling and a few dollars per ton for packing, it would not leave him enough to pay the Mexican miners \$1 a day for taking out the ore.

A number of other locations having claims between the above mine and the Ostrich are complaining of financial starvation. The Yellow Jacket, after suffering from the same cause for long years, shows a prosperous condition. The 20-stamp mill is in constant operation, and the ore body of sufficient size to require only eight miners to keep it supplied with ore.

Oro Blanco, May 13, 1890. I. C. U.

"Loss of Gold."

EDITORS PRESS:—On returning to this city, my attention was called to an article in the *Miner*, published at Nelson, B. C., and headed "The Best Method to Treat Gold Ores," which article is signed "James Dalevan."

This article, like for line (except the title) was written by me and published in the MINING AND SCIENTIFIC PRESS of April 11, '91, under the heading of "Loss of Gold—Practical Tests in Milling the Gold-Bearing Rocks." It is incredible to think that any piece of humanity making the least pretense to respectability, would, (unless there is some onerous mistake) so unblushingly put before the public another's work as his own.

Stealing literary labor is considered an unpardonable act, but how much baser is it when one appropriates the results of manual labor, and moneyed expenses with it.

The tests described in my article cost over \$500 to make, and I gave them to the public for their benefit. It is very strange that any one would be wilfully guilty of such an act as the one above referred to.

ALMARIN B. PAUL.

San Francisco May, 10, '91.

EXPANSION AND CONTRACTION OF STEEL RAILS.—A roadmaster in *Railway Age*, says that steel rails expand or contract one part in each 148,000 parts with each degree of change

in temperature. The Pennsylvania railroad tracks from New York city to Pittsburgh are 353 miles in length, and in the distance the expansion of the rails will amount to 12 feet 6 inches for every degree of change in temperature. Between the 90° weather of August and the zero temperature of mid-winter, the tracks shrink 1134 feet, or more than one-fifth of a mile.

English Mine Statistics for 1890.

The statistics of the mines of the United Kingdom together with the Isle of Man for the year 1890, have been published, and of them the *Iron and Coal Trades Review* presents the following summary:

During the year the total number of persons employed in and about all mines in the United Kingdom, together with the Isle of Man, and inclusive of those employed on private branch railways and tramways, and in washing and coking coal on premises adjacent to or belonging to the mines, amounted to 674,434, of whom 5390 were females above ground. The number employed in and about all the mines, exclusive of all those employed in these ways, was 655,287, of whom 5599 were females, the aggregate increase being 48,132. The total number of fatal accidents was 899, and the total number of deaths occasioned thereby 1206, being a decrease of 13 in the number of fatal accidents, and an increase of 73 in the number of lives lost, compared with the totals of the preceding year; there was one death for 543 persons employed, which is more favorable than the ratio, one in 538, of the preceding year.

The total number of persons employed in and about the mines under the Coal Mines Regulation Act was 613,233, of whom 4206 were females working above ground, the aggregate increase being 49,498, compared with the preceding year. There were 861 fatal accidents and 1160 deaths, the number of accidents being 13 more than the preceding year, and the number of deaths being 96 more. There was one fatal accident for every 712 persons employed, and one death for every 528 persons employed. The accident ratio is more favorable, but the death ratio slightly less so than in the preceding year.

The total quantity of mineral wrought in the different districts was 194,605,887 tons, of which 181,614,288 were coal and 3,117,476 ironstone, the rest being fire-clay, oil shale, and other minerals, making a total increase of 4,972,231 tons compared with the preceding year. There was an increase of 4,697,564 tons of coal, but a decrease of 153,066 tons of ironstone. The ratios of the fatal accidents and the deaths to the number of persons employed in and about mines under the present and former Coal Mines Act are given in averages for the periods covered by the first three acts and in detail with averages since 1872. From these it appears that the occupation of the miner is now more than twice as safe as it was at the commencement of the Mining Acts, the average ratio under the first act being one death in every 233 persons employed, under the second act one death in 258, under the third act one death in 312, under the fourth act one death in 496, while for the last year it is one in 528—a much more favorable ratio.

A table of the hours of the deceased persons' shifts in which the fatal accidents happened shows that in only five cases had those to whom the accidents occurred worked more than 12 hours overtime.

The number of persons employed on private branch railways and tramways, and in washing and coking coal on premises adjacent to or belonging to the mines, was 19,147, of whom 291 were females; the number of fatal accidents was 33, and the number of deaths resulting therefrom was 34. There was one fatal accident for every 580, and one death for every 563 persons employed, which are more favorable ratios than in the preceding year.

The output of coal last year shows an increase of nearly 53 million tons over that of 1873.

The total number of persons employed under the Metalliferous Mines Regulation Act was 42,054, of whom 1393 were females employed above ground. There were 38 fatal accidents and 46 deaths, the number of accidents being 26 less and the number of deaths 18 less than in the preceding year. There was one fatal accident for every 1106 persons employed, which are more favorable ratios than in any preceding year.

Need of Ventilation in Cars.

Considering the importance of ventilation in cars, and how much has been said and written about it, it seems remarkable that so little has been accomplished to improve it. When persons fall into error, it is because they either believe something which is not true, or do not believe something which is true. Now, in our ventilation, the true thing that is not believed is the absolute need of furnishing an adequate supply of fresh air to keep the atmosphere in a car pure.

The average car-builder and architect will always assume that by simply making a number of holes in the top of a car or apartment, that the bad air will escape, but he never seems to inquire how the fresh air, which must take its place, will get in. We remember once seeing the principle of ventilation illustrated very forcibly in a car shop. It was found that newly varnished blinds for car windows would not

dry unless a certain amount of warmth was applied. A close apartment or drying-chamber was then constructed, which was warmed with steam pipes. In it the drying proceeded to a certain extent and then stopped. Investigation showed that the air in the chamber absorbed a certain quantity of the volatile constituents of the varnish, but would take up no more than a given amount. If the air which was thus charged was removed, and a fresh supply was furnished, the drying continued, which led to a system of ventilation by a fan, which forced air into the chamber, and that which had absorbed some of the component parts of the varnish escaped through suitable openings. Simply adding ventilators for the escape of vitiated air was not sufficient. A constant and certain quantity of that which was fresh had to be admitted to the drying-chamber. The same principle applies to car ventilation. There must be an adequate supply of fresh air to keep the atmosphere in the car pure. Such a supply is not ordinarily furnished on the vestibule trains.—*Railroad and Engineering Journal*.

The best ventilated car we ever rode in was one on the Connecticut River R. R. some years ago. This was a smoking-car, and between each seat was a round six-inch hole clear through the bottom. This let the foul air out, and the fresh air came in at the top. This car was always clear of smoke, and it was warm, too. The principle was correct.—*The Engineer, N. Y. City*.

The Big Things of This World.

The largest suspension bridge in the world is the one between Brooklyn and New York. The length of the main span is 1595 feet 6 inches. The entire length of the bridge is 5989 feet. Fortress Monroe is the largest single fortification in the world. It has already cost the American Government over \$3,000,000. The water battery is considered one of the finest military works in the world. The loftiest active volcano is Popocatepetl (smoking mountain), 35 miles southwest of Puebla, Mexico. It is 17,734 feet above the sea level and has a crater three miles in circumference and 1000 feet deep. The largest university is that of Oxford, England. It consists of 25 colleges and five halls. The most extensive park is Deer Park, in the environs of Copenhagen, Denmark. The inclosure contains 4200 acres and is divided by a small river. The largest pleasure ground in America is Fairmount Park, Philadelphia, which contains 3740 acres. The largest body of fresh water on the globe is Lake Superior. It is 400 miles long, 160 miles wide at its greatest breadth, and has an area of 32,000 square miles. Its mean depth is said to be 200 feet and its greatest depth about 900 fathoms. Its surface is 635 feet above the sea. The largest tunnel in the world is that of St. Gothard, on the line of railroad between Lucerne and Milan. The summit of the tunnel is 990 feet beneath the surface at Andermatt, and 6600 feet beneath the peak of Kasselhorn of the St. Gothard group. The most extensive cavern is the Mammoth Cave, in Edmonson county, Kentucky. It is near Green river, six miles from Cave City and 28 miles from Bowling Green. The largest trees are the mammoth trees of California. One of a grove in Tulare county, according to measurements made by members of the State Geological Survey, was shown to be 276 feet high, 105 feet in circumference at the base, and 76 feet at a point 12 feet above the ground. Some of the trees are 376 feet high and 34 feet in diameter. Some of the largest that have been felled indicate an age from 2000 to 2500 years. The largest island sea is the Caspian, lying between Europe and Asia. Its greatest length is 760 miles, its greatest breadth 270 miles, and its area 18,000 square miles. The largest empire in the world is that of Great Britain, comprising 8,557,658 square miles (more than a sixth part of the land of the globe), and embracing under its rule nearly a sixth part of the population of the world. In territorial extent the United States ranks third, containing 3,580,242 square miles, including Alaska; in population it ranks fourth, with its 60,000,000 people. Russia ranks second, 8,352,940 square miles. The highest monolith is the obelisk at Karnak, Egypt. Karnak is on the east side of the Nile, near Luxor, and occupies part of the site of ancient Thebes. Its whole length is 122 feet, its weight 400 tons. Its height, without pedestal, is 180 feet 10 inches. The Chinese wall is the longest wall in the world. It was built by the first Emperor of the Tsin dynasty, about 220 B. C., as a protection against Tartars. Its length is 1250 miles. Including a parapet of five feet, the total height of the wall is 20 feet, thickness at the base 25 feet, and at the top 15 feet. The largest library is the Bibliothéque National in Paris, founded by Louis XIV. It contains 1,400,000 volumes, 300,000 pamphlets, 175,000 manuscripts, 300,000 maps and charts, 150,000 coins and medals. The collection of engravings exceeds 1,300,000, contained in some 10,000 volumes. The largest hell in the world is the great hell of Moscow, at the foot of the Kremlin. Its circumference at the bottom is nearly 63 feet, and its height 21 feet. Its weight has been computed to be 443,772 pounds.—*Machinery Market*.

JUDGE—"Prisoner, are you married?" Prisoner—"No, yer Honor; those scratches on my face came from stumbling over a barbed wire fence in the dark."

Equitable Protection to the Brain-Workers.

The sessions of the "Patent Congress" at Washington have attracted attention anew to an old subject and revived the familiar and ridiculous criticism that our patent laws serve to promote monopoly.

The American patent system simply aims to secure to one sort of property the protection which the laws of all countries afford to other kinds. A man's house or his horse is his own to hold for proper use against all the world, and all the rents or earnings are his by universally recognized rights. Yet a man's house or horse is no more his own than is his thought, but rather less; and why should not his mental possession be guaranteed to him as well as his material property?

It is to guard this right of the idea during the process of actualization so that it can be seen, felt and made useful and enjoyable that our patent laws exist. They are not in their nature monopolistic, but the reverse, for their is nothing more opposed to monopoly than the free development of practical individual thought. The function of the inventor is to innovate, to break in upon some long-established method, of substituting a new and better one for it. Its tendency is to prevent monopolies from becoming inveterate, and indeed, to cut the very ground from under their feet. If established monopolies could have their way they would stop invention except by their own employees, and some of our monopolistic corporations have devoted so much energy to this end that they have been serious obstacles to the progress of American inventive science.

The operation of the patent laws is not one-sided. The discoverer of a novel and valuable apparatus or process surrenders to the world at large his secret, which is often the only product of a lifetime of wearying thought and unremitting industry. In return the country simply guarantees to him opportunity for income from his own creation during a short term of years. The world is the gainer in the advance of prosperity, comfort and intelligence. The inventor's gain, even in the rare cases in which it proves really remunerative, is but trifling compared with that derived from his thought and labors by his fellow-men. Ordinarily invention does not pay. Some of the most notable inventive achievements of the age have left their creators impoverished. It is the instinct and faculty of creating, which in literature is called the poetic faculty, that in mechanic arts and material science becomes invention. It is the natural field of bright and practical minds, of intellect of the sort upon which freedom and progress depend. There is nothing in all our institutions more truly or more happily American than the patent system of the United States.

It is to our patent laws as much as to any other cause that our country owes its prosperity and its prominence in the world. The patent system is one to be guarded with the utmost care and preserved in its vigor and purity against all corruption and abuse. Sincerely, competently and purely administered, it will continue to be one of the most interesting and beneficial features of our Government.

Silver at Butte.

The fact that this is the greatest copper producing camp in the world is apt to obscure in many minds the importance of the silver interests here. The mines from which the white metal is produced would be the first in any other camp of the world, and are only overshadowed here, as is the rest of the metal producing world, by the wonderful copper properties that have made Butte the admiration and envy of all its competitors.

In a general way the silver belt lies west and north of the city with the copper on the east. The two belts, however, merge into each other, and the ground between bears both metals. A queer instance of this is to be found in the Gray Rock, which is about on the boundary line north between the two. Here the ore bodies are found in chutes, one of which will be chiefly valuable for silver, while perhaps the next will be rich in copper. North of this point are found many of the most valuable among the silver mines of the state. It is the opinion of a great many of the best posted miners in the camp that as soon as these mines have been sunk to a sufficient depth their ore will all be found to be copper. This is the case with the Park Canyon mines, where the rock here silver on the surface and is chiefly valuable for copper now that some depth has been attained. The same was found to be true of a number of the mines on this side of the valley, which are now noted for their output of copper. This, should it prove to be the truth, would not detract from the value of the properties in the least, and in fact the same authorities declare they would be even more valuable.—*Inter-Mountain.*

RUSSIAN MINES.—A few days ago 300 pounds, or 10,800 solid pounds of gold (one good Russian equals 36 pounds English), were received at the mint in St. Petersburg from the Crown mines, in the district of Irkutsk. In the last 50 years about 60,000 pounds, or 2,160,000 pounds of gold (English weight), have been obtained from the gold washings of Eastern Siberia alone. Silver, lead, copper, etc., are

found in still greater quantities in Siberia, and when the trans-Siberian railway is constructed the yield of the precious metals will most probably be double what it is at present. The coal and naphtha beds of Russia are another source of future wealth to that country. Out of a single spring in the vicinity of Baku, Messrs. Noble Brothers obtained during the past year 25,000,000 pounds of naphtha, which represents a cash profit of 1,500,000 roubles, after paying 100,000 roubles for the rent of the ground on which the spring was tapped. This spring is now still giving about £50 worth of naphtha a day. The vast coal beds of Russia have still to be exploited.

What We Owe to the Invention of Machinery.

Few persons have any correct idea of the difficulties which were met with 60 to 70 years ago in making suitable tools and machinery from metal. There were no planing, boring or shaping machines; the turning lathe and the drill-borer were about all the devices which could be called into use by the mechanic of that time. Inventors had to make by hand the machines they invented, with the aid of other machines in making the individual parts. They had to invent some tools so as to be able to make certain parts of their invented machine. When the celebrated English machinist Clement entered a shop as master at London in 1814, he found the tools so poor and defective that he had to spend days in making such ones as were needed. James Watts, the inventor of the steam engine, could not get his first machines in working order in consequence of a lack of some contrivances. The first cylinder which he had cast was not tight, and was on one end five millimeters wider than on the other. A good cylinder should not show more difference in width than one-half millimeter.

And then the cost of work at that time was extravagant. Whitworth, one of the oldest manufacturers of working machines in England says that the polishing of cast-iron cost \$3 per square foot 40 years ago, as the work had to be done by hand. The manufacturer Perry paid for the first steel pens \$1.25 a piece, but still these pens were not as good in quality as those which are made to-day. After factories had been established, the price of a steel pen was still \$1, then 50 cents, and then 25 cents, which price was kept up for some time. To-day one can get a gross for that price; all owing to our perfect machinery.

Chicago's Leaning Tower.

As one of the attractions of the World's Fair, Chicago proposes to construct the greatest leaning structure in the world.

This engineering novelty is a massive tower, having an elevation of 225 feet, about 70 feet square, and boldly leaning 100 feet from the perpendicular. The entire structure is of metal, principally steel, weighing about 500 tons above the foundation, and of novel cantilever construction that affords all requirements of stability. It will be built to safely sustain a load of 160,000 pounds on the floor of the top story.

The framework is of steel truss construction, forming a huge cantilever of enormous strength and rigidity, which combines for support a sub-structure of metal. The depth of sub-structure is 45 feet, area 165x115 feet. The construction of the foundation is chiefly of plate-riveted iron girder work imbedded in concrete, which forms a solid bed about 18 feet deep. This girder-concrete foundation has the characteristic of being continuous in structure and rigid throughout, and is especially designed for building on yielding substrata, such as the deep clay of Chicago. On the girder work, there are bolted steel bearing plates, and on these plates the massive truss-foot of the cantilever rests. This foot at the left side will be attached to metal parts of the bed by large steel pins and eye-bars, but these connections will not be brought into play unless the tower is heavily loaded.

In the superstructure, three lines of trusses constitute the main supports, two, forming sides of the tower, the third has a middle position, and a lateral truss system braces them together. Pin connections are used for truss members. The walls of the tower are comparatively light, being simply a framing of small-sized angle iron attached to the truss work, and having a facing of embossed sheet metal. The exterior will be painted a dark terra-cotta color.

Electric hoist elevators and easy stairways conveniently lead from entrances to the upper stories. Above the first story, there are five floors. They are inclined, and consist of a series of broad steps extending across the tower. Numerous windows light the interior, balconies provide interesting outlooks for visitors, and at the top of the tower an extensive view of the surrounding city and a mid-air realization may be had. A delicious buffet serving light refreshments will be in the top story, and about midway will be the tower observatory shop. The visitor can also reach the foundation and view its construction.

The structure is designed by J. B. Halpinny, architect, who says it will take eight months to complete the work, including the shop work and erection. The cost will be about half a million dollars.

The Truth About Aluminum.

Despite the emphatic denial recently published that there was any need of lowering the price of aluminum below \$2, owing to the demand for it at that price exceeding the present supply, it appears that it is now being offered to the trade by one of the manufacturers at from \$1.25 to \$1.75 per pound, according to the quantity, says a writer in *Fire and Water*. There has been a great deal of exaggerated nonsense written about this metal and the use to which it is adapted, and to which, in time, we may expect to see it put, as, for instance, in the construction of ships and bridges, in place of iron and steel. It possesses, however, undeniably valuable qualities, and as the methods of producing it are perfected and the cost still further reduced, it is likely to be utilized to advantage in the stead of silver, German silver, copper, tin and zinc for a number of the purposes for which these are used.

The most valuable qualities of aluminum, as enumerated by a recent authority upon the subject, are its ductility under drawing processes and its non-liability to corrosion. It can be rolled into sheets .0007 inch in thickness, beaten into leaf, drawn into tubes and spun or stamped into various shapes. It is susceptible of a high degree of finish by polishing or burnishing. It becomes hard by working, and requires frequent annealing. It melts perfectly fluid at about 1300° but becomes granular at about 1000° F. It is most easily worked at a temperature of from 200° to 300°. It is apt to become granular and to stick to the rolls at a higher temperature.

As to the corrodibility of the metal, it is unaffected by either dry or moist air, by water, by sulphuretted hydrogen or other sulphur vapors, by salt sea water, a weak solution of salt in acetic acid or by sulphuric or nitric acids. These acids, however, rapidly act upon the metal in the presence of chlorine. It will be readily understood, then, that even if some of the extreme claims made for it are unfounded, its cheap production will prove of great advantage to many different industries.

Domestic Tinplates.

A recent announcement was to the effect that an important establishment had resolved to abandon the erection of a contemplated galvanized sheet works, and to devote whatever capital and energy might have been required in that direction to the manufacture of tinplate. The admitted reason for this change of purpose was, that under existing trade conditions the manufacture of tinplate held out more inducements than the manufacture of galvanized sheets. It must be confessed however, that progress in domestic tinplate making has not been so rapid as many people hoped that it would be. Tinplate andterne plate are being made at several works, it is true, and preparations are going on looking to the erection of other plants, but there is a conservatism, a deliberation, about the whole proceeding which is decidedly at variance with the activity promised by the advocates of a tinplate industry. It had been supposed that a large number, if not a majority, of the sheet mills would add cold rolls and tinning stacks as soon as an adequate tariff protection was assured.

It has been urged that if there is ever to be a time when the manufacture of tinplate will be taken up by the sheet men generally they could hardly find the conditions more favorable than they are at present. While, of course, all the sheet mills in the country are not adapted to rolling sheet for tinplate, a number of them unquestionably are. We are informed that the assurance of a regular supply of black sheets at a suitable price is all that is needed to lead capitalists to embark in putting up the efficient number of tinning stacks.—*Metal Worker.*

IRON IN WASHINGTON.—The Edinburgh *Capital* says: It is an established fact that as fine a quality of pig iron can be made from the iron ore found in this vicinity as is made any place in the United States. Our mountains are full of the ore, fluxing and fuel are to be had in abundance, and there is only one thing in the way of producing pig iron and even steel rails and other products of the mill. We are experiencing just what every new country goes through—that is lack of capital. We know just what can be done here, for in a small way it has been demonstrated that our ore is easily and cheaply worked; the market is waiting for our product, but we have not heretofore produced it. Nothing now stands in the way of this desirable result but money, and while a large sum is needed to establish immense works, a comparatively small amount would put fire in the furnaces and enable us to produce enough pig iron to give us a favorable introduction to the market. This done, we would consider the battle won and our iron industry would be on its feet to stay. The day is not far off when our reconnores in this line will be fully appreciated, and then capital will be glad to come to us. It cannot afford to ignore the riches that lie here ready to be turned into money, and when the present financial stringency has passed away there will be an awakening here such as no one now dreams of and Edinburgh will take her place as the iron city of Washington and hold it against all comers.

Buried Trees in Gravel Mines.

In the gravel deposits of the ancient river-beds of the Forest Hill Divide in this State, trunks of trees similar in appearance to our present oaks and oaks are found imbedded in the upper layers, either petrified or somewhat lignitized. Mr. Ross E. Browne, in a chapter of the *Mineralogist's* report on ancient river-beds, calls attention to an interesting occurrence in the Weske channel. The cement filling the bed to a depth of 100 feet is a more uniformly fine-grained sediment than is commonly encountered. It incloses a number of oak and cedar trees, standing on the banks of the channel, with the roots intact in the gravelly soil and bedrock. One of these is a cedar nearly 100 feet in height and 4 feet in diameter at the base, and stands perfectly upright, and, considering its age, is in a surprising state of preservation.

Similar standing trees are also found in the Bowen mine, in the same channel. These trees are immediately on the shore line of the shallow deposit of gravel, and show that for a few centuries at least before, the depositing of the volcanic material was a small one.

These standing trees show also that the first flow of the auriferous cement was not torrential, though moving with a certain velocity. The existence of a current, and its direction, are plainly indicated by the structure of the deposit immediately surrounding the trunks of the trees. The deposit where these standing trees are found is entirely covered with an extensive and deep cap of lava.

Coal Dust a Cause of Explosions.

It having long been suspected that coal dust in mines, becoming ignited by powder blasts, were the cause of violent explosions, the following remarks of the Hon. H. Mathews, Secretary of State, Province of Nova Scotia, will be read with interest, these remarks being addressed to the Inspector of Coal Mines:

"My attention has for some time been directed to the effect which the presence of coal dust in mines may have in originating or in propagating explosions. Two disastrous explosions have occurred in the course of the present year at the Ilanerob Colliery and the Morfa Colliery. Both of these explosions were made the subject of careful investigation by competent men.

"The conclusion deduced by Mr. Hall from experiments is that a blow-out shot may in the presence of coal dust, and in the entire absence of fire-damp, cause explosions of great violence, often accompanied by volumes of rushing flame, traveling considerable distances, and possibly so far as the supply of coal dust continues.

"I strongly urge upon colliery managers that in all mines of at all a dry and dusty character the accumulation of dry coal dust should be prevented by removing the dust and watering work-places and roadways (roof and sides as well as floor), and further, that shot-firing with gunpowder should only take place when all the workmen have been withdrawn from the seam."

QUARTZ AND GRAVEL AT TRUCKEE.—Mr.

McGlashan in running a tunnel for water in the side hill just above and west of Mrs. Cassidy's, has struck a bed of gravel that has every appearance of having once been the bed of a large stream. The gravel is coarse and washed smooth. Jack Williams prospected a shovelful of it and succeeded in getting several ounces of gold. The cut and tunnel is now in about 50 feet. Bedrock has not yet been reached and the width of the channel is not known. It is possible that pay gravel will be found next to the bedrock. Somehow no one ever thinks of this part of the country as containing any valuable deposits of gold. It's too high up, the experts say, and there is too much granite in the country. But experts don't know everything. The fact of the matter is, this section has never been prospected. To be sure there were two or three mining excitements in this neighborhood in the early sixties, but they petered out. Yet we have been told that a low-grade ore can be found at the old site of Knoxville and Claraville up the river and at Elizabethtown on Martie Creek. There are some good-looking ledges near Bronco, and across the river from Truckee there is a lot of float quartz. Colors of gold have been found in the bed of the Truckee river, and so it seems that there is gold in this neck of the woods. But nothing has been done in the way of prospecting for many years. It might pay to prospect a little. There may be valuable minerals, or useful rocks found in this neighborhood, for there has been but very little geological work done hereabouts. We have been told of the existence near here of deposits of a volcanic rock which is fire-proof and again of a substance akin to kaolin, also of a substance resembling gypsum. How extensive these deposits are no one knows. It might pay to find out.—*Truckee Republican.*

WHOPER.—Yes, sir, that cat of mine could spring fifty feet after a mouse, and—Breakley (who stutters)—Whew, what a—l—l—l—Whopper—It is not a lie, and I'll knock you down if you don't take that back! Breakley (continuing calmly)—L—l—l—lively cat!

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

FROM SUTTER CREEK.—*Ledger*, May 23: Work about the Hector is being actively pushed. The 40-stamp mill is running to its full capacity on surface rock and dirt, of which there is a sufficient quantity to run for some time. The company intends to put up hoisting works in the place where but a short time ago they tore down the old hoist. The program, after the hoisting works are running, is to at once drain the shaft, do the needed repairing, and then proceed to crisscut and drift at the bottom, so as to determine what there is left in the mine at the present depth.

THE LINCOLN.—The lessees of the Lincoln are working hard to get the property on a paying basis if possible. The ore so far encountered is of a very low grade and, unless there is an improvement soon, the work will probably come to a standstill.

THE BELMONT.—The Belmont is looking encouraging from the appearance of the plates. The superintendent writes: Surface tunnel now in 300 feet, the last 10 being in the east ore vein. Upraise No. 1 has been started with a view of stopping above tunnel level, as the walls are too high, and will have to timber the same and do away with present open cut. Ten stamps are running and have lost no time the present month.

AT VOLCANO.—The Morseno Bros. have struck it richer than ever in their gravel claim, the Battle Mountain.

BAY STATE.—The newly-elected directors of this company held a meeting on the 18th inst. and organized by the election of officers as follows: W. T. Jones, president; W. A. Green, vice-president. It is expected to begin work about the first of next month, and certificates of stock will be ready to deliver to subscribers in a few days.

BELL WETHER.—After sinking to a depth of 100 feet, it was found impracticable to get deeper with the present facilities for controlling the water, which is very abundant. Accordingly they are now drifting for the ledge at the 100-foot level, and expect to reach it this week.

Calaveras.

TO HAVE A MILL.—*Chronicle*, May 23: The Lava Bed gravel claim, near Railroad Flat, owned by Lampson and Evans, has proven by the prospecting operations which have been going on for some time, that the deposit is extensive and rich. This having been established, preparations are being made to put up a five stamp mill on this mine.

THE QUAKER CITY MINE.—The water having all been taken out, the shaft repaired and everything put in order for work, sinking was commenced in the Quaker City mine, when a fine body of ore was encountered. The vein of quartz is about four feet in width, of the kind known as "ribbon rock." This is at a depth of nearly 400 feet. Mr. Tom Goodwin, the superintendent informs us that so far the outlook is very encouraging.

LOOKING WELL.—The Orchard mine at the lower end of town seems to promise well. At a depth of about 45 feet the blue gravel was struck, and on Thursday it was prospected and found to go 25 cents to the pan. The volume of water does not increase with the depth, but on the contrary seems to grow less. It is now easily controlled by the pump. At the present writing it is of course impossible to tell whether the main channel has been struck, or merely a wash that may continue or may not. It is supposed to be yet about 40 feet to the bedrock. If there should be this amount of gravel, all paying as well as the present prospect, this will be one of the richest mines in the vicinity.

SALE OF A MINE.—*Prospect*, May 23: The Shendoah Mining Co., composed of Oakland parties, have purchased what was formerly known as the Hoosier mine, now the Shendoah, located near the Calaveras river, above Jesus Maria. The mine has been operated under bond by this company for more than a year, with William Craih as superintendent. The outlook of the mine warranting it, the purchase of the property was consummated this week.

GOOD ROCK.—The rock recently crushed in the Campbell mill at Murphys that was taken from the Wood's mine is reported to have gone \$35 per ton free gold, besides a large amount of exceedingly rich sulphurets, 1600 pounds from 16 tons.

PROSPECT FOR WATER.—H. S. Blood made a trip to his place at Bear Valley last week and reports four and one-half feet of solid snow all over the country. This snow fell early in the season and will not run off at the first glimpse of sun. This will keep the head streams of our rivers plentifully supplied with water late into the summer.

REPORTED SOLD.—There is a report that the Osborn mine at Albany Flat near Altaville has been sold. This is likely to be one of the best paying properties on the Mother Lode as the deposit is very extensive and the rock very rich.

El Dorado.

SEARCHING THE GOLD BELT.—*Genetown Gazette*, May 21: H. W. Turner of the United States Geological Survey will shortly leave San Francisco for extensive investigations in the gold belt of California. His work is not as important in the view of exploration as that now being carried forward in Alaska, but it is of great moment as bearing upon the mineral resources of the State. The State Mining Bureau is now conducting operations similar to that in which Mr. Turner will engage. The two results, separately obtained, will be valuable for comparisons in the same field. D. P. Gray came up from Oakland during the week to be present at the starting of the mill on the Gray and Bosquit claim. Everything is now in complete working order, and the mill has started to crush the eighty tons of rock now on the dump.

Inyo.

DOING WELL.—*Index*, May 20: The Enterprise Mining Company, at Redding Canyon, has just shipped a car-load of ore to Salt Lake for reduction. It assayed \$8 per ton. Four men are at work in the mine, the lode being eighteen inches wide. Owing to the large amount of ore, soda, borax and marble being shipped from Inyo county, an extra engine has to be sent from here to Ham-mill station once or twice a week, to help the regular train over the summit of the White Mountains.

Lassen.

DIAMOND MOUNTAIN MINES.—*Advocate*, May 21: On Tuesday last the Honey Lake M. & M. Co. started up the 10-stamp mill on Gold run creek, on ore from the Superior and Gray Eagle mines, and expect to keep it running all summer. They have about 250 tons of ore on the mine dumps and will keep a force of men extracting ore from both mines for the balance of the year. Supervisor Perkins, W. B. Long, L. H. Peck and Thurston Thomas are the leaders of the enterprise, although there are several other stockholders residing here, and others in the East. The prospects for a profitable run are flattering, and we hope for the good of the company and this community generally that the highest hopes of these enterprising gentlemen may be fully realized.

Nevada.

THE CENTENNIAL.—*Transcript*, May 25: Superintendent Richards of the Centennial says that to the last upraise above the new tunnel, at a distance of about 12 feet, he cut into a fine body of gravel, rather dry and much cemented. It is as blue as indigo. He took out about a carload of the gravel and the cleanup of it shows numerous lots of fine heavy gold, such as should be found in the main channel. The pitch of the bedrock is toward the face of the tunnel, which should cut it in running about 100 feet farther. Capt. Richards has sent a sackful of gravel to the office in Gold Hill.

PEABODY MINE.—The new shaft on the Peabody mine is now down 200 feet, and is a fine piece of mining work, and has been sunk to an even incline of 36 degrees. The shaft has to be sunk 50 feet more to reach the bottom level.

Placer.

EXTENDING THE WATER SYSTEM.—*Republican*, May 20: The South Yuba Water Co. has made some extensive improvements on its property in this county since Jan. 1st. In Auburn the company has laid 200 feet of four-inch pipe, mostly on Commercial street, through Chinatown and over the College tract, and the cost of improvements in the Auburn district has been \$2000. In the Clipper Gap district the tunnel has been cleaned out and retimbered, and the improvements made in that vicinity have cost \$700. In the Gold Hill and Ophir district \$225 has been expended in rebuilding the flume near Bear river and cleaning out branch ditches. Around Newcastle and Plumas all the branch ditches have been cleaned out at a cost of \$1132. At Penryn 700 feet of 11-inch pipe has been laid. Other improvements here and there have cost \$3380 since the beginning of the year, making a total of \$7937 in addition to running expenses. On Monday the company sent off an order for 2100 feet of four-inch pipe, which is to be laid to the town of Lincoln. It is not expected that there will be a shortage of water anywhere this summer.

Plumas.

STRUCK GRAVEL.—*National*, May 23: On Thursday afternoon news was brought to town that gravel had been struck in the Slate Creek mine, owned by Halsted & Swiggart, and located on Hungarian hill. These gentlemen have been engaged in running a tunnel since July last to tap this channel, which could be traced on the surface for a distance of a mile and a half. They run in 720 feet, breaking through into gravel 204 feet from the surface. The gravel looks favorable and they seem confident that they have struck a bonanza. This development is in a rich and paying section where thousands of dollars have been taken out in years past, and where, it is hoped, thousands may yet be brought forth.

NEAR GIBSONVILLE.—Work is progressing at the Thistle shaft. Mr. C. B. Wingate, the managing superintendent left for the lower country last Friday. They are working eight-hour shifts in the tunnel, Mr. F. A. Gourley having charge of the works.

DRIVING TUNNELS.—East and southeast of the Genesee mine there rises to the height of 1000 feet a mountain of metamorphic rocks, seamed with stringers of rich gold ore, iron and copper stained, and in some cases containing a high percentage of good sulphurets. Heretofore all the prospecting on this hill was done on its very top, affording little opportunity for successful mining—a fine field, in fact, for a waste of muscle, energy and time. At present, however, tunnels are being driven into the hill from its base and better things may be looked for.

San Diego.

MORE CEMENT KILNS.—*Union*, May 21: Work is being hastened at the Jamul cement factory. President Warren Wilson says, on the five additional kilns that the increased business of this new industry demands. They are getting the fire brick from the South Riverside company, 105 tons being en route, instead of sending to San Francisco as was done for the two first kilns. Ten tons of boiler iron has been ordered from San Francisco for these new kilns. The first hatch of cement turned out was used six weeks ago to lay the pavement before the north side store room of the George J. Keating building on Fifth street, and shows that the Portland cement of San Diego county is somewhat darker than the imported Portland adjoining it. Experts say that the local cement is more of a true Portland color, being a dark bluish brown. Prof. Leonard of Los Angeles, writes that the carload shipped them was eminently satisfactory, and he would like all that can be had. The professor thus corroborates his first estimate of the cement, as it was he who made its true quality known. Another carload has been forwarded for the beet sugar factory at Chino.

Shasta.

COAL DISCOVERY.—*Free Press*, May 23: An important coal discovery is reported near Eiler's ranch on North Cow creek. A gentleman named Jay Conklin has opened a vein of coal five feet thick and of splendid quality. The lode or strata lays 60 to 100 feet under solid sand rock, and is not mixed with clay, as are all other finds in the locality heretofore mentioned.

IRON MOUNTAIN.—The Iron Mountain mill started up last Monday, but broke some of the machinery in a short time, and work was again shut down for a week or two.

FROM IGO.—Work on the Crystal tunnel has been delayed by accidents and sickness. The first ledge, about thirty feet from the one being run far, has just been cut, and shows fine ore. Robinson & Co. have rebuilt their arrastra, and have been running on South Chicago ore. They are now get-

ting a car load of silver ore ready to ship from the Pearl. Wm. Streater has found several ledges on Sec. 21, near the Lee place. He has built himself a cabin, and is at work taking out some good ore. D. H. Hubbard is running his arrastra on Cold Spring ore. Shirland Bros. are running their arrastra on Creighton ore. E. L. Ballou's arrastra is running on Manzanita ore. W. P. Litten is getting out ore at the Continental, and will start up his arrastra soon. Charley Rossie is grinding ore from his new find on Andrew's creek. Doc. Dunham is running a tunnel on his Muletown ledge with good prospects ahead.

Sierra.

NEAR SIERRA CITY.—*Mt. Messenger*, May 23: There was a large cave at the Mercer & Salines quartz mines a few days ago, wrecking chutes and covering considerable pay ore with debris. The damage was not heavy, but will somewhat lessen this month's cleanup; the previous one was very good. There is abundance of ore at the Young American No. 4 tunnel, but thus far, very little gold in the quartz. A rich chimney may though he struck most any time as this is the heart of the gold belt. The ever energetic and persevering owners have the best wishes of the people, at home and abroad, for a golden winning with the spring roses. The Sierra Buttes Co., 'tis said, will soon be 'getting a move,' rebuild their upper mill and employ about 60 or more men when—some of the far-away, long absent boys may "come home again."

DRIFT MINE.—Capt. Meikle was over from the B. M. Ex. mine, Wednesday. He has not yet been able to get any lumber either for the purpose of building a reservoir or for a foot plank for the track. During the past ten days he has put in a 200-foot turnout which will hold nearly all the cars which the company has at present. When drifting is begun, both up and down the channel, gravel coming from both ways will be made up into trains on this siding, to be taken thence to the dump by mules. The last raise put up to gravel exposed a heavier wash than either of the others. At this point the bedrock was a trifle lower than at the shaft raised just before, and the gravel is the best looking that has yet been found. It has not yet been possible to do anything toward making a large dump. It is at present proposed to work the channel entirely through chutes. A tunnel will soon be started from the present tunnel up the channel with a heavy grade, and another down the channel with just as light a grade as will carry off the water encountered. This will be almost equivalent to two mines, and will enable the management to much sooner put on a large force. By this manner of working there will be no necessity of leaving any gravel pillars to support the main tunnel, but when a convenient distance has been worked another chute can be raised and all behind it abandoned.

Siskiyou.

QUARTZ DISCOVERY.—*Journal*, May 23: The discovery last week of a five-foot quartz ledge on the west side of Langell valley by Mr. Anderson of Lost river has set the mining element agog again, and it is now predicted that this country will be found to be full of paying mineral veins when the miners thoroughly prospect it.

WILL NAVIGATE THE DITCH.—The Little Klamath Ditch Co. proposes to operate a small scow bottomed steamer on their new 40-foot ditch when the same is completed, which will be a great convenience to dwellers at Tule lake and vicinity and which cannot fail to prove a profitable investment.

Sonoma.

PINE FLAT CINNIBAR MINES.—*Tribune*, May 21: O. C. Huebner is engaged in surveying the Red Buck mine, the property of W. F. O'Leary and Jas. Condran. It is said that Hassett intends building a large furnace at the Hoffman mine. John Swift & Co. have contracted to run a tunnel 200 feet, an extension of the Crystal mine. By a 65-foot cut a rich ledge, three feet, six inches in thickness, was reached in the Crystal mine a few days ago. It contains five per cent mercury. Ore of two per cent quicksilver is penetrated by the 140-foot tunnel. Excavation of seven feet more in this tunnel, it is expected, will reach a very precious ridge. The proprietors of this mine are highly elated over the prospects and as soon as possible operations will be commenced. Mr. O'Leary is assiduously engaged in preparing for the operation of his mines and it is hoped that his endeavors will meet with success.

Tuolumne.

POCKETS.—*Independent*, May 23: Warren Stinchfield struck a pocket in his mine, at Jackass Hill, on Thursday last week, from which was taken out the sum of \$2000. Good prospects are reported in the Sell pocket mine.

WILL TEST IT.—It now seems as if the owners of the Calaveras mine, at Robinson's Ferry, have set to work in earnest with the evident intention of finding out what is in the mine. The mine is a good one and only requires push and coin to prove it.

NEVADA.

Washoe District.

ON THE COMSTOCK.—*Territorial Enterprise*, May 23: The 1400 level station of the Potosi winze has been cut out, and prospecting on this level has been commenced. The interest in the situation at the Potosi will be maintained until the country is fully prospected to the water level. A strike of a body of ore in Potosi would give the market a strong backbone.

CROWN POINT.—The north drift from the 300 slope, eleventh floor, was continued to a total distance of 41 feet. Nothing of importance was encountered. An east crosscut was then started from the south end of the sixth floor, which is now out six feet. The face is in a mixture of clay and quartz, giving low assays. The 1000 level east crosscut from the main south drift, having been extended twenty-six feet during the week, is now out a total distance of 104 feet; the face is in soft porphyry.

CHOLLAR.—The south drift, 1400 level, from the north line, is out 110 feet, face in porphyry. The winze in the joint east crosscut, north line, 1400 level is down eight feet; the bottom is in porphyry. Extracted and sent to the mill the past week 539 tons of ore worth as per battery samples, \$18.10 a ton.

POTOSI.—The winze is down 103 feet below the

1400 level; the bottom is in porphyry and streaks of quartz. The south lateral drift from the winze station, 1300 level, is out 228 feet; face in porphyry. The south lateral drift from the Chollar incline, 1100 level, is out 172 feet; face in porphyry.

WARD COMBINATION SHAFT.—The south drift from the 1800 station is out 22 feet in hard porphyry.

NEW YORK.—North lateral drift, 600 level, is in north of shaft 270 feet; face in porphyry. North lateral drift, 1100 level, is out north of shaft 494 feet; face in low-grade quartz.

SILVER HILL.—The southwest drift, 50 level, is out from shaft 40 feet; face in porphyry and quartz. South crosscut, 160 level, is out from winze 535 feet; face in hard porphyry.

ALPHA.—The winze 80 feet north of shaft, 500 level, has been connected with the 600 level.

EXCHEQUER.—The east crosscut on the north line, 600 level, is in hut 204 feet, face in porphyry.

UNION SHAFT.—West drift from the shaft, 900 level, is out 212 feet, making 53 feet during the week; the face is in hard porphyry.

SAVAGE.—We have hoisted 586 cars of ore from the 500, 750, 800, 950 and 1400 levels. Shipped to the Mexican mill 534 tons and milled 440 tons; average battery assay, \$16.49. We have haulion on hand amounting to \$13,883.96. The G street tunnel has been advanced 40 feet since last report, making its total length 540 feet. The Ophir Mining Company has received a shipment of four bars of bullion, valued at \$4,261.75, being the product of 835 tons and 1600 pounds of ore worked at the Morgan mill. The yield of the ore in bullion per ton was \$15.86, of which \$5.94 was gold and \$9.92 was silver. The average assay of the value of the samples per ton was \$26.41.

ALTA.—The mill is now working five stamps on ore extracted from the old reserves above the 900 level.

YELLOW JACKET.—Are shipping about forty tons of ore daily to the Vivian mill, and preparing to extract gold-bearing rock for shipment to the Santiago mill.

JUSTICE.—The usual prospecting work is reported from this mine during the week, with nothing of importance to note.

SIERRA NEVADA.—630 level: West crosscut No. 1 from the northwest drift, 571 feet from the shaft, has been advanced 35 feet; total length, 477 feet. The formation is and has been hard.

UTAH.—Incline winze has been sunk 24 feet; total depth, 64 feet, continuing porphyry, clay and quartz, assaying low in the precious metals.

ANDES.—On the 420 level east crosscut from south drift has been advanced ten feet; formation vein porphyry. East crosscut from the north drift on the 420 level has been extended sixteen feet; face in quartz.

The Gould & Curry, Challenge, Best & Belcher, Hale & Norcross, Con. Imperial, Belcher and Seg. Belcher are all actively prosecuting their usual amount of exploratory work.

Candelaria District.

THE HOLMES MINE.—The company is now extracting ore from the 2100-foot level of the Northern Belle mine at Candelaria, and obtaining a rare kind of silver ore that is a pure turquoise in color and quite rich. The mine at that depth continues, as it has from the surface, to be as dry as a powder horn, and there has never been a drop of water encountered in it.

Esmeralda District.

VARIOUS MINES.—*Walker Lake Bulletin*, May 20: In the Lapanta mine a fine body of \$80 gold ore is being opened above the level of the old tunnel. Drifting northeast on same at present, toward the dyke. The ore is holding strong, and quite a large body is opened to be stumped. An incline is being sunk below the tunnel, and is now down sixty-five feet, following under the gray cap. It shows a fine ledge in the bottom, which is now carrying some gold, and rich ore is expected in the next eight or ten feet. In the Pamlico the main tunnel is being driven ahead and some fine ore taken out. From the Central a large amount of high grade lead and silver ore is being extracted from the main incline and the slope south of it. Considerable gold ore is being got from the same slopes. The soft part of the ledge is high grade gold. On the Hartford an incline is being sunk on the vein, the ledge being from eight to ten inches wide, the ore running from \$40 to \$50 gold.

CHALLENGE.—The tunnel is being run on the vein exposing a good-sized ledge. Considerable 175-ounce ore is being extracted.

WAR EAGLE.—Fair grade of ore is being extracted. Two car loads will be shipped this week.

White Pine District.

LEAD ORES.—*White Pine News*, May 19: The miners of White Pine mountain have about 600 tons of lead ores for shipment to Salt Lake. The ores of White Pine are heavier in lead than those of any other section in the west.

DEEP CREEK.—We have heard of no miners or others in this section being carried away with Deep Creek excitement. One reason for this no doubt is that our people know something of that country, and another, that they believe the mining field here at home is better than that of Deep Creek.

CHERRY CREEK.—Letters from Cherry Creek state that the new mill at the Star mine was started up last Saturday and is running nicely. So far as tested the concentrates from the dump are said to be a paying investment. All of which we are really glad to note.

ALASKA.

FROM THE MINES.—*Juneau Record*, May 7: The Silver Queen Mining Co. is doing good work on their Sheep Creek properties and is pushing everything ahead as rapidly as possible. The 10-stamp mill is completed and soon will be in running order. Work will soon be commenced on a tramway from dump to the ore bin on the flat, after the completion of which the mill will be started. During the past two seasons this company has shipped ore below for treatment and has received handsome returns and is now thoroughly satisfied with the true value of the property and will henceforth operate it on an extensive scale. During the week T. D. McMannus and James McDonald returned from a prospecting trip and brought in some very fine silver rock. The ledge is about five feet wide and can easily be traced for a considerable distance. The

are free milling and the ledge crops out on the beach where vessels can anchor within a stone's throw. There is plenty of water and timber in close proximity which will greatly facilitate the cheap working of the mine. It is their intention to do considerable work during the summer. It is reported that Richard Willoughby is about to make a sale of his Admiralty island property to a syndicate of mining capitalists. Last year Mr. Willoughby erected a small mill on this property and made a short and most satisfactory run and if the property should change hands it is probable that more extensive works will be placed thereon. There are many good mining properties on that island which are only waiting capital to turn them into dividend paying concerns. Mr. Thomas Mein, superintendent of the A. T. G. M. Co., returned on the Mexico and has again assumed charge of that company's gigantic mining works. The warm rays of the sun are having a great effect on the snow and slides can be heard in all directions. Monday a large slide came down the mountain this side of Sheep creek, just opposite Treadwell's piling now on the beach to a depth of about 60 feet. Wm. Antisell will open his assay office in a few days in the room next door to John Prior's place of business on Water Front. On the arrival of the Topeka it is expected that many of Alaska's mining men will return to engage in the mining industry during the summer. Chas. Forrest is engaged in running a tunnel on the Salmon creek properties owned by Messrs. Maloney, Gamel and others.

ARIZONA.

MINING NEWS.—*Journal-Miner*, May 20.—The Tiger mine is in splendid condition, there being an abundance of ore in sight in all the workings. The Big Bonny is pronounced by experts to be the finest and clearest quality of any yet discovered. J. W. Dougherty returned yesterday from Big Bug, where he procured about 1½ tons of onyx for shipment to the Smithsonian Institution at Washington. The onyx was shipped this afternoon. J. H. Hamilton, A. P. Smith and Scott Greening purchased the Rich Hill mine belonging to the estate of Wm. Johnston. The latter, it will be remembered, was buried alive in his tunnel, in November last, and efforts to reach him proved fruitless. The new owners will, however, now work the property. Prof. Douglass will leave in a day or two for a visit to Bisbee, but will return here in time to start up the Copper Basin plant in a few weeks. Experimental runs of this property have proven satisfactory. The Copper Basin works will be started up now within a few weeks. The plant recently put in there is a very extensive one and is said to be very complete. Work on the dam of the Lynx creek hydraulic company will be commenced in a few days. The volume of water in the creek at present is too great to permit of the work being commenced, but is decreasing rapidly. Twelve men are engaged at the Blue Dick mine taking out ore for shipment. This mine has never yet failed to respond and yield a dividend for its owners when worked. There are about 25 tons of ore on the dump now awaiting shipment to the sampling works.

BRITISH COLUMBIA.

A RICH DISTRICT.—*Inland Sentinel*, May 23: Spilliamacane mountain, 1½ miles from the river and about 40 miles from Golden, says a correspondent, is practically a mountain of concentrating and smelting ore. Galena lodes running from 30 to 80 per cent lead and 20 to 40 ounces in silver; copper veins assaying from 30 to 80 per cent, and from five to 30 ounces of silver abound on it, and this is only the result of the croppings, as no depth has been reached on any of them yet. Mr. McCrae has been working on those two mountains for the last four years, but like the majority of the claim-owners, has only just been able to keep up his assessments. He has unbounded faith in them, however, and says all they want is a little capital and they will have the richest country in America.

THE NORTH THOMPSON RIVER.—This river up to date has not been prospected to any extent. The few who have gone up the river in search of ore have succeeded in their mission, and those who will follow may reasonably expect a like share of fortune. The North Thompson district lies between the vast placer mines of Cariboo and the Big Bend country, and is easily accessible. It is one of those regions which is naturally of rich mineral wealth, and has not been gone over by the prospector. We fear that the lack of success of prospectors is too often attributable to the fact that they go over ground which has already been covered, the infatuation of their business leading them to hope that they may hit upon something which those who preceded them have passed by. Here is a district lying between two of the richest mineral sections of the province as yet developed, and still remains practically unprospected. If the Westminster Co. would turn their attention to the North Thompson they would do well.

COLORADO.

VARIOUS MINES.—*Georgetown Courier*, May 19: About 400 feet west of the Grant tunnel and 30 feet higher, was driven the McNulty tunnel a distance of 300 feet, which intersected the vein showing about five feet of ore similar in character to that disclosed in the Grant tunnel. A drift has been run east 90 feet (toward the Grant tunnel) and west 120 feet, with the same ore body continuous throughout. Recently the Kohn tunnel has been started near the extreme east end of the property, and about 200 feet lower than the McNulty tunnel. After driving but 70 feet the lode was encountered just below bed rock, and a drift driven west 20 feet, which has two feet of first class ore in the breast. The ore upon the ground fills every bin and bouse that can be reserved for its accommodation. The soft snow has broken up the winter roads and for a little time makes it impossible to ship. Like all bonanza mines, wherever this mine is touched it seems to yield marvelously. From the Kohn tunnel on the east to the McNulty tunnel on the west is about 1100 feet linear measurement and 200 feet perpendicular, yet these workings and the intermediate workings disclose the same ore body. The Free-land mine, on Trail creek, has yielded up an ore body about 2000 feet in length, one of the largest, if not the largest found in this country. The Leadville-Pennsylvania promises to yield as large a body,

for the extension of the mine is worked by the same owners and is also yielding large quantities of ore. C. L. Billings had a mill-run from the American Sisters which returned in three classes as follows: First class, 136 ounces silver, .3 gold to the ton and 14 per cent lead; second class, 290 ounces silver, .25 gold to the ton, 8 per cent lead; third class, 126 ounces silver, .1 gold.

THE GREAT LEADVILLE-PENNSYLVANIA BONANZA.—From time to time we have spoken of the property owned by Col. Morrison, Ernest Le Neve Foster, Burton Hopkins and Mason Hall. It has now developed into one of the really big mines of Summit Co. and the output is estimated by carloads; in fact there seems no end to the ore body which has been opened up practically for 1100 feet in length and about 200 feet in depth. The properties consist of seven patented lodes, about three miles from the town of Chihuahua in Summit county. The main lodes are the Pennsylvania, Paymaster and Hall. The first development was by the Grant Tunnel started about the center of the claim, which at a distance of 65 feet intersected the Pennsylvania lode, disclosing from 5 to 7 feet of ore running about 40 ounces silver and 50 to 60 per cent lead.

BIG GOLD FIND.—*Aspen Times*, May 21: A big gold discovery has been made in the Gunnison, upon a branch of the Denver & Rio Grande railway. It has been known that gold-bearing quartz existed in the neighborhood, but only one miner stayed with his property, and he came to Denver and made a trade with some parties in the city, who have formed a company, and they intend erecting a large stamp mill near the mines as soon as possible.

Professor James R. Manes, a mining engineer, was sent to examine the property, and he says he was much surprised to see several large quartz dykes running due east and west, and some two miles from where these dykes cross the river, he found other quartz dykes running due north and south, crossing the first named dykes, showing that fine milling gold quartz is there in such quantities that many large stamp mills could be kept busy for many years to come, working night and day. Mr. Manes took some of the ore from one of the mines and had the same assayed, and had a mill run as follows: No. 1 mill runs \$10.96, No. 2 assayed \$48.80, No. 3 assayed \$84. "These were picked specimens," said Mr. Manes, "but all the ore will pay to stamp and plate much better than the Black Hills ore that is now being worked by the Home Stake and the Father D. Smith. Their monthly returns are very large, still the ore only averages about \$3 per ton.

AT THE IRON MASK.—Vast surface improvements are going on at present, consequently development underground is not as extensive; but as soon as the surface work is finished underground operations will be pushed with renewed vigor. The upper 150 feet of the tram has been torn up and will be sunk lower, in order to give the cars free access to the ore bins. Grading has been done for an office building for the mine, an addition to the assay office. The large crib for waste is finished, and a number of men are working on the switch of the tramway. Mine workings at present consist of three contracts: 6 and 10 levels and a raise at the breast of the incline. A raise run recently in No. 10 level, 10 feet back from where the drift resumed operations struck, in a few feet, a 6-foot body of lead ore, which will average 8½ ounces in silver, 20-100 gold and 54 per cent lead. The ore from No. 3 crosscut runs 378 ounces in silver and two ounces in gold. The mine is showing up remarkably well in every part, and is good for a prosperous year under its present management.

IDAHO.

BOISE COUNTY NOTES.—*Statesman*, May 19: This has been an unusually dull week in the Basin, as a great many of our people were at Boise City to witness the Presidential reception and shake hands with the bead personage of this great nation. Most of them have returned and are loud in praise of the royal manner in which they were entertained and shown around by the people of the thriving and beautiful capital of our young, and destined to be great State. Mose Kemper has brought to town several large specimens of ore from his mine, the Moscow, in Eldorado district, a few miles beyond the More creek summit, and two miles west of the Banner road. He had men at work all winter running a tunnel, which reached the vein a few days ago. The ore is very rich in silver, but only carries a very little gold. A large number of claims have been located in that district during the past two years.

MONTANA.

THE REGION ABOUT HELENA.—*Mining Journal*, May 20: The enlargement of the smelter plant at East Helena, mention of which has heretofore been made in the *Journal*, will consist, for the present, in the construction of additional roasters, work upon which will be commenced during the present week. The general manager, Mr. Raht, has the plans completed, and the construction will be vigorously prosecuted. Three stacks are now running, and the fourth being relined will be blown in within a few days. If the ore supply warrants, the promise now being that it will, additional stacks will be added to the plant this season. As yet there is no promise of the reopening of the Anaconda. Of the seventy-five men at work at the mines fifty-three were laid off on Monday by Mr. Daly, an action certainly not indicative of early resumption. The Summit mine in the Dog Town district is shipping ore. It is being loaded on the cars at Toston and this shipment will go to Aurora, Ill. The bottom of the shaft now to the depth of 215 feet shows seven feet of pay ore. Bud McAdow has returned to the Spotted Horse mine at Maiden and has added to the working force, thirty-five men at present being employed. There are eight shifts of four men each being engaged in sinking the shaft. The present force will be further increased this week. P. Larson has returned from a visit to the Helena and Frisco mine, and reports that the mine is looking well and that indications point to the indefinite continuance of regular dividends. This mine is assuredly a bonanza. Good reports continue to come from the Emery, or Carbonate Hill mine, in the Zosel district, Deer Lodge county. With the exception of Mr. Halteman, of Helena, the new purchasers are all residents of Deer Lodge. They are managing the property on a strictly business basis, confident of possessing a mine of permanent

value. The shaft of the Silver Dollar in the Park district has been sunk to the depth of about eighty feet, instead of ten feet, an erroneous statement that broke into the mining column of the *Sunday Journal*. The new host on the Bald Butte is finished and in operation, and the officers are now on the ground with parties with whom the company is negotiating for the erection of a new twenty stamp mill. Governor Hauser returned from a trip to Missoula and the Curlew Mine in which he is largely interested. He was, on his return, accompanied by Stoner Blake also one of the owners, it being upon his ranch that the mine was discovered. The mine is producing, and there is being put through the concentrator about 120 tons of ore daily, enabling the company to ship from nine to twelve car loads of concentrates monthly.

NEW MEXICO.

MINING MATTER.—*Silver City Enterprise*, May 22: Mr. Kellum is running his mill at Gold Hill and making it pay well. Col. Prichard is taking out good ore on the White Signal at Gold Hill. Col. Bill Wells, of Gold Hill, sold his Gold Dollar mine recently for a snug little sum. The Little Fanny Mining Co. has raised \$30,000 to develop the mine and improve its mill. Capt. J. N. Sawyer started the development of the Pacific mine, which he owns in partnership with Joe Sydenspinner. While sinking an air shaft on the Reservation at Gold Hill, ten inches of ore was struck which average \$150 per ton in gold. The American mine at Hachita has been closed down on account of the suspension of operations at the El Paso smelter. It will be some months before the smelter is again ready to blow in. The consolidated Nebraska Co. of Pinos Altos, has now reached a depth of 210 feet with its main working shaft, and will continue to sink 60 feet farther, at which point a crosscut will be run to tap the vein. At a depth of 40 feet the lead was carrying 15 inches of good ore, and if it continues at that width to the proposed depth, the company will have a mine that is worth talking about. The two smelters at Clifton have shut down owing to an insufficient supply of coke, caused by an accident to a bridge near hear. Mails have arrived regularly.

NEWS FROM THE MINES.—*The Pinos Altos*, May 22: The Mountain Key is nearing the 700 foot level and is looking fine. The crosscut from the shaft to the lead, 50 feet in the Kleptomania mine, will be completed next week. The Huston & Thomas mines are being worked with a full force. The Long Brothers are taking out some fine ore and are running it through an arrastra with satisfactory results. The excavating in the Mammoth mine is completed and everything is in readiness for the stamps, which are expected any day. The Kleptomania is at this writing in splendid shape and capable of putting out all the ore the company can handle, and fine ore at that. John McDonald, owner of the Arizona No. 2 mine, is driving a tunnel to connect with the main lead. He is in 285 feet, and as soon as he gets under a 135 foot shaft will make an upraise for air. This property is looking fine. Williams and Burton, who are contracting on the first level of the Kleptomania have struck it rich. Some time ago they run into a fine though small vein of ore which has steadily widened, and now they are stopping and drifting on as pretty a lead as can be found in the camp. The Wagner mill, after having lain idle for some time, is undergoing necessary repairs and will start up again some time the coming week on ore from John McDonald's mine, after which ore from the Bennett mine will be worked. Jack Magee, Silver City's efficient boilermaker, is superintending the work, which is a sufficient guarantee that the work will be well done. The first carload of ore from the Golden Rule mine, in Arizona, arrived this week and will be run through the Bell & Stephens mill in a few days. This will be a test run, and while the ore itself is rich and carries considerable free gold it is uncertain whether it can be successfully worked here. However, a few days will decide the matter, with the probabilities all in the affirmative.

OREGON.

FROM THE MINERAL DISTRICTS.—*Times*, May 22: The mines of Baker county will yield handsomely this year. Prospectors are leaving the city daily for the various mining districts. Another rich pocket has been struck in the Blackwell district near Willow Springs, which bids fair to prove a bonanza. Full particulars are not yet furnished the public. M. L. McCall of Asbland has located a quartz ledge in the neighborhood of Gold Hill, which bids fair to prove valuable, samples of the ore showing free gold to the naked eye. G. W. Houck returned from a trip to Southern Oregon the forepart of the week. He showed us a fine quartz specimen taken from the ledge of his son, Jesse, in the Gold Hill district. He also had some specimens of iron ore unearthed near Monroe in this county, which promises to be of great value. W. F. Davis left for Cornucopia Monday morning. He goes to examine the remains of his mill, which was destroyed by a snowslide last winter, with a view of putting it on its feet again.

CINNABAR.—The capitalists who are interested in the development of the quicksilver mines in the Cinnabar region made them a visit last week and were delighted with the prospect. We are informed that they will soon put a large force to work and make arrangements to operate on a large scale. It is the general opinion that those mines will yield big returns if worked properly.

SOUTH DAKOTA.

COPPER AND SILVER MINES.—*Deadwood Pioneer*, May 19: The reporter of the *Pioneer* has obtained from the superintendent of the Deadwood and Delaware Smelting Co. the following information in regard to the plant, operations and mines: Our claims consist of the Sonora and the Two Bears. The outcrop of the Sonora is about 200 feet east of the Oro Fino and dips toward it. The Oro Fino is vertical. At a depth of 250 feet the dips would bring them together. From the bottom of the Oro Fino shaft at a depth of 230 feet, we ran a crosscut to the Sonora and cut as handsome a vein of ore as has been discovered in Custer county, except that we have 18 feet of solid ore between two smooth well defined walls. The ore is a mixture of zinc-pyrite and galena, carrying both silver and gold. It is low grade, but the lead separates by mechanical

separation nicely from the iron and zinc, and when so concentrated has a value, where we cut it, of about \$80 per ton. The ore body is at least six times as thick as the Judd discovery, where I saw it, over which there is so much talk. We can trace the vein about 2,000 feet upon the surface. The smelter as at present designed, includes crushing and sampling works for about 250 tons of ore per day. Two water-jacket furnaces each three by seven feet, and two reverberatory furnaces each having hearths 12x15 feet. The furnaces have some peculiarities of their own as indicated by our last summer's work. We shall begin work with only one of each of the furnaces. The works were designed so as to be extended to 500 tons daily, should occasion require it. Your other questions concerning cost of plant, cost of treatment, amount and kind of flux, and what we propose to do with the matte, are matters pertaining to the company's private business and do not concern the public. I decided to answer fully your questions concerning the mines in hope that others will prospect elsewhere upon the same lines, for should lead be discovered and mined in sufficient quantities our works can be changed to lead smelting works like those at Omaha, upon ten days notice. The owners, the Swift Bros., and Pennypacker, will be here June 3rd and decide many things now unsettled.

UTAH.

MINING NOTES.—*Park Record*, May 23: The Ontario mill shipped 43 bars bullion this week containing 27,385.69 fine ounces of silver. The Ontario company is engaged in washing away the dumps at Nos. 1 and 2. This is an annual performance and is rendered necessary to make dumping ground. The operation generally carries considerable good ore down the creek and makes money for miners who follow jiggling for a living. The following lots of ore were received at and forwarded from the Macintosh sampler during the present week: Ontario, 635,620 pounds; Daly, 276,420; Anchor, concentrates, 298,200 pounds; A total of 1,210,240 pounds. The large Knowles pump expected by the Ontario company for use on the 1500-foot level, arrived this week and will be taken up to the mine early next week. The Kentucky leasers have finished re-timbering the old portion of the tunnel and are again working in the face. The vein is expected to be encountered almost any day. Monday last Engineer Langford tried the new tramway engine, after devoting a few hours to getting her in shape. The machine works like a charm and climbs the hill without an effort, barring the fact that on one or two of the shortest curves she binds a little on her trucks. That feature can easily be remedied and was one of the defects of the old engine. A few hours careful labor will place the new engine in first-class shape and capable of doing all that was expected of it. There are tons and tons of second-class ore and a large quantity of first class already stowed out and stored, and when the property is well opened out and the force increased the shipments will be large, rich and constant. It is entirely in keeping with Rebellion hill that the Roaring Lion should develop into a rich producer, and even if the coming summer should fail to see it such, the coming year surely will.

WASHINGTON.

AMONG THE MINES AND MINERS.—*Okanogan Outlook*, May 13: There are 40 men at work on the First Thought and the force is being increased every few days. The Lone Star is again in active operation. The water has all been removed and preparations are being made to prosecute work in both the 200 and 300-foot drifts and also in the main shaft. By the first of next week there will be fully 20 men employed in and about the mine. From the drift in the 200-foot workings of the Fourth of July, Prof. Reilly, who recently bonded a group of mines on Mt. Chapaca, came to town this week and was interrogated by a reporter as to the progress of development on the mines. The tunnel is now in 45 feet. Two shifts are being worked at present, but another will be added in a short time so as to expedite the work as much as possible. The ledge is between 10 and 12 feet wide, and the tunnel is now in a four-foot vein of good pay ore, assaying from 75 to 150 ozs. per ton. The ledge matter is trachyte and the country rock on both sides is granite. It is principally a gold ore, but carries some silver. Work will be prosecuted on the tunnel all summer. C. H. Ballard, who has the contract for patenting the Ivanhoe group of mines, returned from Palmer mountain Saturday after making the final survey of the group. "This is the first instance that has ever come under my personal observation where mining has been done with a plow and scraper," said Mr. Ballard, who always grows enthusiastic when speaking of this mine, and they have shown up more actual wealth in a few weeks in this manner on the Ivanhoe than could be done by the expenditure of thousands of dollars on any other prospect I know of. They have now a space uncovered of 72x117 feet, exposing that much surface on the ledge, which is lying nearly flat on the ground and averages 18 inches in thickness. It is all pay ore, and the whole body will average about \$100 per ton. It is estimated that there are between 800 to 900 tons uncovered and on the dump which is worth at the least calculation, \$80,000. About \$30,000 worth of this will be sorted and shipped during the summer. It is the intention of the owners to ship only enough ore to pay for prospecting the lead and putting in a mill. They will first prospect the lead by sinking a perpendicular shaft at a point 80 feet west from where the ledge has been stripped. From the dip of the vein it is estimated that 100 feet will tap it. If not, they will then drift to the ledge and then crosscut it. The shaft is already about 45 feet down.

WYOMING.

FROM THE GOLD FIELDS.—*Review*, May 21: Charles B. Loomy of Larimer, has lately visited the Gold Hill fields, and reports everything there in a promising condition, though the snow had not yet disappeared. Most people are taking hold of placer-mining. The Leviathan is down over 100 feet. The character of ore is unchanged for the entire depth. The enterprise improves in the quality of ore as it goes down. It shows a great deal of silver. The Cummins City stamp mill has been taken to Gold Hill and will be put in operation soon.

MECHANICAL PROGRESS

The Largest Stove Factory in the World.

In Detroit, Michigan, there is a stove foundry that is remarkable in many particulars. To begin with, it is the largest concern in the world devoted exclusively to the production of stoves. It is called the Michigan Stove Works. About 1300 men are employed and 70 tons of iron are daily melted and made into stove plates, the works making it a practice to so arrange their business that the amount of work done per day is pretty nearly uniform throughout the year. The foundry floor is equivalent to a floor 640 feet square. About 250 different styles of stoves are made. A correspondent of the *American Machinist* gives a very elaborate description of these works, from which we condense.

Testing the Iron.

All the iron used in this establishment is carefully tested by a skillful expert. The iron is tested in the form of bars, which are strictly confined to bars of one size, viz., 3" square and 12" long. These bars are tested in two different ways—by impact and by a steadily applied load, the machines being so arranged that each of them automatically makes a graphic record of the behavior of the test bar, its deflection, permanent set, and the stress which finally breaks it. This is accomplished by surprisingly simple machines, but in which there has been great ingenuity displayed.

This firm has added materially to the general stock of knowledge concerning irons, and may be expected to add more, and to help in diffusing that knowledge among the men who can make the best practical use of it.

A New Method of Making Stove Patterns.

A very peculiar system of making patterns for stove-plate work has been introduced there which is worthy of notice on account of its ingenuity and the results accomplished by it.

The old method of making stove-plate patterns, and the one which is still followed in most foundries almost universally, is to make the first pattern of wood, the outside being first carved into shape and then the back or inside to correspond, so that the pattern shall be uniformly of the specified thickness, usually one-twelfth inch. When the pattern is highly ornamental and intricate, as most stove-plate patterns are nowadays, the reverse side is much the most expensive to make, because its thickness must be constantly gauged as the work goes on, this gauging being anything but easy, especially where the pattern, besides being intricate, is of large size. This wood pattern is used but once, usually, the casting made from it being finished up for regular use in making stove plates.

By the improved method the form of the outside of the pattern only is carved on a block of wood, and this is then covered by a preparation of wax, which is put on soft in a number of coats of uniform thickness. It then hardens, and is removed from the carving, one side (that which was next the carving) being then exactly the right shape for the inside of the pattern, while the other is right for the outside, and it is of precisely uniform thickness. It is stiff enough to retain its shape well, and is, when thoroughly hardened, covered all over with a thick plating of copper, deposited by an electroplating process, which is analogous to that of electrotyping, if not precisely the same. This copper is also of precisely uniform thickness, of course, and the result is a pattern which is in every way much superior to a wooden one, because the copper easily takes a fine finish which is conducive to exceptionally smooth castings for the regular foundry patterns, and which require much less labor to finish than is the case where they are made from wood patterns. The copper pattern is unaffected by dampness, and is much more liable to be the same as when first made, in case it should be required for use a long time after being made. The pattern is much stiffer than would be expected. It was evidently much stiffer than a wooden one of the same thickness. The correspondent did not know whether the process would be applicable to any other kind of work, and thinks that it is covered by patents, but at any rate it was a matter of considerable interest to him, and he supposed it would be to most mechanics.

The Machinist's Shibboleth.

To form an estimate of a machinist's ability, in these days of improved methods, is not so easy a matter as it was 30 years ago. Almost everything is now done on machine tools, and the hammer, chisel and file are little used. In the old time, it was by his manner of using these that we were accustomed to gauge the skill possessed by the new man. If he took hold of his hammer handle at the middle, and struck as if his elbow had no joint, or took up a file with his thumb under the handle, and shoved it across the work with a teetering, jerky motion, he would at once be put down as an impostor.

Sometimes worse hindrances than these were committed. For instance, grinding the cutting edge of a drill on the wrong side, or attempting to put a belt on a pulley from the wrong side.

The file test is a good one, and if followed up, may put to shame some who claim to be good workmen. We wonder if one in ten of

the thousands of machinists who read your paper can file a spot on a round iron bar, perfectly straight, crosswise. We have seen such a surface concaved by the slight rotundity of the file. One of the interesting features of this performance is the nice vibratory movements of the joints in the arms and body that are necessary to secure the perfectly parallel motion of the file. Comparing these with the mechanism in the beam engine, the latter is very simple, for in this there is but one point to be kept in a parallel line (the crosshead), while with the file both ends must be controlled and held true to a line. Yet the operation seems very easy when, by practice, the art is acquired.

The plumber takes pride in his "wiped joint," the Slater in shearing and punching his brittle material like so much putty, the blacksmith his perfect weld, and the machinist will ever esteem his dextrous use of the file as one of his best proofs of skill.

One of the modern tests, we believe, is the use of the scraper; and the fitting together of two surface plates so perfectly that they can only be separated by sliding them apart, may be considered no mean art.—*Scientific American*.

JAPANESE SKILL IN METAL WORKING.—The Japanese are past masters in the treatment of alloys both in texture and in color, and no better guides exist. They achieve their grand results by the simplest means—a judicious blending of various metals, inlaying and pickling. Copper is the basis of their chief alloys, and by incorporating with it certain proportions of gold and silver they obtain remarkable results in color through the pickling process. But not only do they get striking effects from their alloys and pickling—their mode of working up the metals is a thing to be studied. For instance, they will take six or seven plates of different metals and alloys, weld them together, and then, by drilling, punching up, and filing, get a surface in which all the metals show in a manner which is truly wonderful. By the range of tints at their command they can work out on a metal surface scenes of animal life, landscapes, etc., with effects never dreamed of by metal-workers in the Western world. Among some examples recently shown in England was a knife handle on which was a representation of a duck dipping its head under the water of a stream on which it was swimming, the arrangement of the different alloys by which it was composed and the pickling being so well arranged that the neck of the duck was seen as under the water, when the handle was held in a certain light. Another example was a sword-hilt on which some minnows not more than one-sixteenth of an inch in length, each having a pair of gold eyes, were swimming upon a gray stream, the effect of their being actually below the surface of the water being suggested with marvelous skill. Imitations of wood, grain, and marbles were also shown.—*Jeweler's Weekly*.

TO COLOR BRASS WORK.—A beautiful violet color is imparted to brass work by the application of chloride of antimony, says a writer in *Work*. Get the work perfectly bright and clean by the usual methods, either in a lathe or by dipping, etc.; heat it over gas flame or spirit lamp, so that water will steam off it but not fizz, and then apply the chloride of antimony liquor with a piece of rag or pad attached to a piece of wood; when the metal has assumed an even color, polish by rubbing with a soft cloth perfectly clean and dry, and protect with a coat of clear lacquer. Should you prefer a darker color, use either of the following recipes: (1) To one part oxide of iron, or iron filings, add one part arsenic and 12 parts hydrochloric acid. Dissolve the oxide of iron or filings in the acid, then add the arsenic, strain and bottle for use. (2) One pint of strong vinegar, one ounce of sal-ammoniac, one-fourth ounce arsenic, one-half ounce alum; dissolve in the vinegar and bottle. These mixtures are to be applied in the same way as chloride of antimony, and, as you are doubtless aware, the ultimate shades may be varied by treating with various lacquers. In all cases, the work should be polished with a dry cloth immediately the desired color is obtained, and in the case of the two latter recipes, the work should be lacquered at once; but with the chloride of antimony, this is not essential.—*Ex.*

JAPANESE CRAFTSMEN.—The Japanese, like the Chinese, are fairly good craftsmen and content with low wages, which enables fairly well-made goods to be placed on the market at cheap rates. In Tokio alone there are nearly 100 boot factories, turning out a large quantity of work, and independently of these there are special factories for supplying the army and navy, and in the provinces several factories have been established. They are well fitted up, and for the most part are replete with the best American machines, which turn out good work and are easily managed by Chinese workmen. They export goods to China and Australia, where they are offered at very low prices. Some of the sole leather is American tanned, but there are also several native tanneries. The Germans will, perhaps, be the greatest sufferers by this new departure, as they have hitherto supplied the bulk of the shoes imported into Japan.

FIR TREE WOOL.—It is stated that excellent wool has been made from the fiber of the fir tree by means of electricity.

SCIENTIFIC PROGRESS.

Flame.

A New Theory of Its Electrical Propensities.

The electrical propensities of flame, remarks the *Indian Engineer*, have been the subject of much curious speculation and experimental investigation ever since those early days when Gilbert discovered that an electrified body, which is not a good conductor, may be readily discharged by passing it rapidly through the flame of a spirit lamp. Although it appeared that the flame carried off the electricity and dissipated it in the air, Gilbert afterward observed that it was sufficient to place an electrified body near a flame in order to deprive it of its charge. The fact is that a flame is a gas or vapor raised to a high temperature by the chemical processes of combustion, and hot gases are invariably good conductors of electricity; currents of very hot air are especially good conductors, and they act even better than metallic points in discharging a charged conductor.

Volta, the pioneer of galvanic electricity, showed that the process of combustion actually generated electricity, and this may be readily demonstrated by placing a piece of burning charcoal or a burning pastille, such as is used for fumigating purposes, in connection with the knob of an ordinary gold-leaf electroscope, when the leaves will instantly diverge.

The diamagnetism of flames was discovered by Bancelari, and Faraday also demonstrated that currents of hot-air smoke, and all kinds of flames are susceptible to the action of magnetic forces. Faraday discovered that not only will a flame rob a charged body of low conducting power of a charge imparted to it, but that it is capable of exercising a certain selective action; thus negative electrification is more easily discharged than positive. Further, flames which are strongly electrified with negative electricity are repelled from conductors, but when they are positively electrified, this is not the case.

The foregoing results represent the chief data regarding the electrical or magnetic character of flames, that have been accumulated up to within recent years. Very little has been so far deduced from these observations, but Faraday made his experiments the starting point for a series of important investigations into magnetism of gases.

Within more recent years, however, the electrical properties of flame have been studied in the light of a more complete knowledge. A year or two ago a valuable contribution to the subject of electricity of flame was made by Elster and Geitel, two German electricians. They observed that flame is strongly polarized in cross-section, and that an electrode in the air about the flame is always positive to one in the flame. It used to be thought that the polarization of flame was longitudinal, but it seems that this is only apparent and due to mismanagement of the electrodes.

The results of their experiments led Messrs. Geitel and Elster to deduce the following theory: By the process of combustion, *per se*, electricity is not produced in flame, but the flame gases and the air envelope have the property of exciting, like an electrolyte, metals or liquids in contact with them. To this electrolytic excitation is added thermoelectric excitation, which is due to the incandescent state of the electrodes. The amount and nature of the excitation is independent of the size of the flame and dependent on the nature, surface condition and glow of the electrodes, and on the nature of burning gases. Among other interesting facts, these scientists observed that the flame may be combined in series, just like galvanic elements, in such a way as to form a flame battery.

The theory which we have just briefly stated, which is the natural inference from Messrs. Geitel and Elster's investigations, has lately received unqualified support from Messrs. Magnus Maclean and Makita Goto, who, working by different methods and on entirely different lines, have arrived at similar results.

It was shown that the flame is negatively electrified, while the envelope of air immediately surrounding the flame is positively electrified. The potential at the middle line of the flame is nearly zero, and the surface of the maximum negative potential lies just inside the flame, while the surface of maximum positive potential lies at a distance of 2 mm. from the boundary of the flame. The maximum difference of potential between the two surfaces lies somewhere between 2½ and 3 volts. Similar results were obtained with other flames, but in case of glowing charcoal, the point of the platinum wire must be brought very close to it in order to obtain the indication of positive potential of the film of air surrounding it.

The magnitude of the electrification of air depends upon the part of the flame that is put to earth. Hence the maximum positive electrification is obtained when the most negative part of the flame is earthed, and vice versa.

Hot air from flame appears to have a different property from ordinary hot air; the different effects were obtained when a large red-hot soldering bolt was used. This was shown by passing the hot air between metal plates, such as unpolished zinc, and polished zinc, polished copper, platinum, etc., and observing the difference of potential in volts. These latest experiments are, without doubt, confirmatory in their results, and they thoroughly support the conclusions of

Messrs. Elster and Geitel. So far no attack has been made on the new theory, which may, therefore, be taken as granted.

CURIOUS ELECTRICAL PHENOMENA DEVELOPED BY ALUMINUM ELECTRODES.—In a paper by M. Nyrrenf, recently published in the *Journal de Physique*, the author states that in a voltmeter fitted with aluminum electrodes and charged with dilute acid, when traversed by an alternating current, hydrogen is given off at both electrodes. Where the oxygen escapes, or what it does, is not stated. Curious though this be, the phenomena displayed when mercury is substituted for one aluminum electrode, the other remaining, and the current is passed through distilled water, are still more remarkable. The author states that under these circumstances the current will pass in one direction only, and he therefore calls such an arrangement an "electro valve." This is not all; the current that does pass is in the reverse direction to that due to a mercury-aluminum couple, and it is notably diminished by the acidulation of the water even in a slight degree.

A GREAT BRIDGE.—The great steel bridge across the Columbia river at Vancouver will be a mammoth concern. It will be 6000 feet from the Washington to the Oregon shore; it will be double tracked with roadway on top for teams, and will be erected upon pneumatic piers. The pivotal pier, or draw pier, will support a draw which will give an opening of 200 feet space on either side for vessels to pass, and the span immediately south of the draw span will be 375 feet. Whole structure to be of steel, built 10 feet above the high water of 1876, and 40 feet above low water. On account of the sandy formation it will be necessary to go down 80 feet below low water to get a firm foundation. This gigantic structure will cost over \$4,000,000. It will be Jan. 1st, 1892, before the cars can pass over it. The company is pushing the bridge and also the road as fast as men and money and their present perfected plans will permit.

NEW USE FOR THE TELEPHONE.—It is said that the telephone is about to have a new application—that of foretelling storms. Another discovery has been made as to one of the properties of this means of transmitting sound. By placing two iron bars at seven or eight meters distance from each other, and then putting them in communication on one side by a copper wire covered with rubber and on the other side with a telephone, a storm can be predicted at least 12 hours ahead through a dead sound heard in the receiver. According as the storm advances the sound resembles the beating of hailstones against the windows. Every flash of lightning, and, of course, every clap of thunder that accompanies the storm produces a shock similar to that of the blow of a stone cast between the diaphragm and the instrument.

ARSENIC IN GLYCERIN.—As mentioned in a note in this journal a few weeks ago, Rikart has demonstrated the presence of arsenic in a large proportion of the samples of glycerin examined by him, even those sold as chemically pure. In a recent communication on the subject, in the *Pharmaceutische Zeitung*, he states that he has become convinced that the source of arsenic thus found lies in the sulphuric acid that is used for the decomposition of the fats in the stearin works, candle factories, etc., whence the crude glycerin is obtained, and that its presence is due to defective methods of purification on the part of the glycerin refiners. The subject is an important one and warrants further investigation.

ALTERNATING CURRENTS.—It appears that Dr. Edward Latum has recently completed some very remarkable experiments on the physiological effects of alternating currents. He finds that the danger of the current diminishes as the number of alternations per second is increased. Thus it took 20 times as strong a current to kill a dog when the alternations were 4500 per second as when they were 120 per second. When the alternations were 300 per second the current was only half as dangerous to life as when the alternations were 120.

STEEL RAILS AS PIT PROPS.—In consideration of the serious inroads which are being made on the timber of this country by the use of wooden props in mines, it is satisfactory to note that a patent has been taken out for a method of making steel rails into pit props and supports for collieries, mines, tunnels, bridges, etc. The rails are cut at their ends and snipshly framed together. In point of cost, it is claimed that this mode of propping compares favorably with other systems.

A NEW YORK INVENTOR has recently patented an appliance for preventing the disagreeable noise often proceeding from an arc lamp. The theory of the invention is that the rapid alternate heating and cooling of the gaseous matter forming the arc is responsible for the trouble, and the remedy proposed is to increase the number of alternations in the current until the rate of vibrations is so great as to exceed one's ability to hear them.

IODIFORM is being made in Germany by means of the electric current. An alcoholic solution of iodide of potassium traversed by a jet of carbonic acid is subjected to the electric current, and Iodoform is produced in shape of small yellow capsules.

GOOD HEALTH.

The Process of Digestion.

We condense the following article on the process of digestion from *Hall's Journal of Health*: The grinding process of food, so essential to its fitness to enter the stomach, is carried on by the teeth. Saliva is an aid to this breaking up. It moistens the food and makes a partial solution of the particles. If it were not for its presence, the mouth would be dry, and it would be very difficult to masticate the food. There is a continuous canal running completely through the body, which is more winding in its course than the most crooked stream. It is called the alimentary (food) canal. The solid food, broken up by the grinding mill, passes through the alimentary canal in a liquid form. This canal is about 23 feet long, has many subdivisions, and is lined throughout with mucous membrane, which is full of blood vessels and secreting glands. The secretions from these glands dissolve the food, and the blood vessels, which are tributaries to the canal, absorb the nourishment from the food solution as fast as it is formed, and convey it to the tissues of the different organs of the body. In the walls of this canal is a muscular layer which causes the canal to contract around the particles of food, thus forcing it gradually along its whole length.

Opening into the mouth are the openings of three sets of salivary glands. When the mouth is at rest, the salivary glands secrete a small but constant amount of fluid, and when the jaws are in motion the flow is rapid. The total amount of saliva secreted in one day is about two and a half pints. The same is true of the other glands, which secrete more abundantly when there is work for them than when in a state of idleness.

The muscular coat of the stomach is quite complicated. The contractions of this muscular layer produce a varied motion to the contents of the stomach. The food is caused to pass along the sides of the stomach and back through the center, thus bringing all particles of food into close action with the gastric juice. By this provision in the structure of this organ an important function is established. When the stomach is empty it is in a state of collapse, and its walls are in opposition. When filled with food it is distended in the form of a sack or bag about one foot long by six inches across. The liquid solution of the food as made in the stomach, is called chyme. The inner wall of the stomach, when it is empty, is thrown into rough ridges, but when it is distended the wall is stretched smooth and shows little openings on its surface. These openings are small depressions from 1-100th to 1-200 of an inch in diameter. In the sides and bottom of these depressions are minute orifices, which are the mouths of the gastric glands. At the upper and larger portion of the stomach is the cardiac valve, and at the smaller and lower end is the pyloric valve. An interesting fact about the pyloric valve is that the side toward the interior of the stomach is covered with mucous membrane similar to that lining the stomach, while the other side is covered with villi, which project from the surface, and are about half a line in length.

The gastric juice has been found to be a colorless liquid, or of an amber hue. Its chief elements are water 975 parts, free acid 4.78 parts, and pepsin 15 parts. Other elements in minute quantities are potassium, lime, ammonium, magnesium and iron. The pepsin is precipitated from the gastric juice if some of the bile flows back into the stomach through the pyloric orifice, instead of passing along the intestine, as it should. Digestion is stopped if either the acid or the pepsin is absent, hence both must be present in solution for the gastric juice to do its work efficiently.

If one has dyspepsia, either there is bile present in the stomach, or the gastric juice has lost its acidity. The chief characteristic of the gastric juice is that it digests albuminous substances. Examples of this work are the dissolving of the white of an egg, the making of liquid of the casein of cheese, while the oily particles are set free. The stomach digests certain portions of the food, the small intestine a certain part, and the large intestine carries away the waste materials. Albumen may be present in many varieties of food; in meats, grains, fruit and in vegetables. Boiling a vegetable greatly aids the process of digestion.

The reason why the gastric juice does not act upon and digest the stomach itself is because the gastric juice is acid, while the blood is alkaline, and as the walls of the stomach are well supplied with blood vessels, the gastric juice cannot react on the stomach, because an alkali and an acid will neutralize each other.

Now we have the stomach occupied with gastric juice and the albumen of food in solution, also the oily matter and starch, apart by themselves and mingled with the other liquid matter. The pyloric valve opens and all of the contents of the stomach pass into the intestine. The pyloric valve closes and the stomach quiets down. Opening into the small intestine are two or more ducts or tubes. One of these ducts introduces the bile from the liver into the small intestine. A little lower down are two openings, the ends of the pancreatic ducts, which permit the flow of the pancreatic juice into the intestine. The important element of the pancreatic juice is the pancreatine. This is capable of digesting the oils and fats, and of

changing the starch to sugar. The bile is present here, and it is supposed that it aids to a great extent as a cathartic in washing out the bowels. The pancreatic juice makes a white, milky emulsion of the fats.

We now have a mixed solution in the small intestine, which is of small calibre and about 20 feet long. On the inner surface are millions of villi, which project into the cavity of the intestine. These villi are traversed by minute blood vessels.

The albuminous emulsion of fats and the sugar are absorbed by osmosis directly into the blood in the blood vessels of the villi. Osmosis means the passing of a liquid through the tissue. The gastric juice is also absorbed from the intestine by these villi, and is secreted again in the glands of the stomach as the albumen is taken up from the gastric juice by the blood. Thus we get a circulation of this gastric juice. It is secreted in the stomach, dissolves albumen and passes into the small intestine, is absorbed by the blood vessels and is again taken up by the gastric glands, where it is ready to be secreted in the stomach again when there is a demand for it.

After the albumen, the fat emulsion and the sugar have been absorbed from the small intestine the debris, in the form of vegetable tissues, undigested animal tissues and the waste from the process of digestion, is passed on to the large intestine.

Food should be properly cooked, and slowly and thoroughly masticated. After a hearty meal the best thing to do is to sit quietly back in an easy chair and doze, while digestion is going on, or for a time at least, until digestion is well under way.

The dinner should come at that part of the day when the most time can be given to it.

Nitrogen and carbon are the two principal ingredients of food. Nitrogen supplies the waste tissues and carbon furnishes heat.

Plants and vegetables inhale carbonic acid gas and exhale oxygen.

Animals inhale oxygen and exhale carbonic acid gas.

Man is no exception to the rule.

USEFUL INFORMATION.

COMPRESSED COAL IN FRANCE.—Compressed coal is coming largely into use in France. It is reported that there is hardly a torpedo boat belonging to France in which the compressed coal dust is not used, and it is consumed in the battle ships wherever possible. These briquettes are generally composed of a mixture of from 8 to 9 per cent of pitch, with 92 to 91 per cent of coal dust. In the most improved machines the coal dust and the pitch are shoveled into a hopper, and it is not touched again until it is automatically stacked in the yard outside the engine-room. The materials are consolidated by means of a mixing apparatus into which steam is admitted. A form of coal which, by itself, is almost useless for burning, is thus converted into a really serviceable fuel, that, as regards cheapness, may be made to enter into successful competition with the best steam coal. More persistent efforts should be made to utilize the mountains of coal waste which are so fast accumulating in this country.

TO DISTINGUISH A GENUINE DIAMOND.—It is said that an expert is no longer required to tell whether a diamond is genuine or not. The test is simple and can be made in any place and in a moment. All you need is a piece of paper and a lead pencil. With the latter make a small dot on the paper, then look at it through the diamond. If you can see but one dot you can depend upon it that the stone is genuine, but if the mark is scattered, or shows more than one, you will be perfectly safe in refusing to pay ten cents for a stone that may be offered you at \$500. Of course a diamond to be subjected to such an examination must either be without its setting, or so mounted that the light will pass through it perpendicularly.

TESTING STEEL TIRES.—The Pennsylvania railroad is engaged in experiments to determine the relative wearing qualities of hard and soft locomotive tires. Dr. Dudley, the chemist of the company, who has charge of the tests, selected steel containing seven per cent of carbon for the hard tires and three per cent for the soft ones. Before being put on the wheels of the locomotive, each tire was carefully marked and measured, and a hard tire and a soft tire was put on each axle, so that a perfectly even distribution of the two kinds of steel was secured. The engines have been in use for several months, and a record is kept of the wear.

BOOTS WITH STONE SOLES, which are said to be very flexible and almost indestructible, are the idea of a German inventor. A thin leather sole is used, a paste of quartz sand and waterproof glue being spread on it.

The average weight of a crowd of men standing as closely together as possible is 34 pounds per superficial foot.

COPPER AND INDIA RUBBER.—It is stated that copper piping when hot has an injurious effect upon any India rubber tubing with which it may come in contact.

The metal in a 5-cent nickel piece is worth about half a cent, and 15 cents will purchase copper enough to make \$2 worth of cents.

ELECTRICITY.

ECONOMIZING IN ELECTRIC LIGHTING.—The filament of the incandescent electric lamp deteriorates after a time, thus causing a diminution of the candle-power, and finally its displacement. To remedy this, two Germans have invented two processes which are now attracting the notice of electricians. The first process consists in the use of osmium, which is deposited on the osmium filament either by electrolysis or by a chemical method. The inventor claims that the melting point of the osmium is so high as to resist the temperature of the electrical current and greatly increase the life of the filament. The other inventor employs the nitrides of silicon or boron for the same purpose. The filament is heated to incandescence in an atmosphere of volatile nitrogen compounds, when the heat reduces them and forms solid nitrides of silicon, which are found to be deposited with great uniformity over the surface of the filament. Another invention relates to utilizing or mending the filaments after they have become useless. The old filament is removed by a special process, with the exception of a small piece which is allowed to remain on the platinum supports. A new filament is then introduced and joined to the two ends of the old filament by another special process. Thus patched the lamp is as good as when new.

AN IMPROVED UNDERGROUND ELECTRIC PROPELLOR.—A new method of applying an electric current to underground wires has been discovered by Western parties. The wire is placed in a conduit somewhat smaller, but much similar in appearance to the cable conduit, and the car is fed by a trolley underneath the car. Hitherto the current has escaped from a bare trolley underground wire in a damp conduit, making it impossible to get the power of the electricity for but a short distance from the dynamo, but by this new system a section of small wire 25 miles away may be charged at practically the same expense as one a block distant. A company backed by half a million dollars has been organized at Tacoma, Wash., and proposes to push the thing to the utmost.

SUBMARINE CABLES.—There are at present 26 submarine cable companies, the combined capital of which is \$200,000,000. Their revenues, including subsidies, amounts to \$16,020,300, their reserves and sinking funds to \$18,050,000, and their dividends are from 1 to 14½ per cent. The receipts from the Atlantic cables alone amount to about \$4,000,000 annually. The number of cables laid down throughout the world is 1045, of which 798 belong to Governments and 247 to private companies. The total length of these cables is 120,070 nautical miles, of which 107,546 are owned by private telegraph companies, nearly all British; the remainder, or 12,524 miles, are owned by Governments.

ELECTRICITY AS AN AID TO BURGLARS.—An expert, not long ago, says a contemporary, chagrined the treasury officials by opening the vaults without a knowledge of the combinations. Now here is a method by which any ordinary burglar with the slightest knowledge of electricity can "crack" the strongest safe built, with dispatch and without noise. Let him connect the safe with one pole of an electric machine, and putting a carbon point on the other pole, place it against the safe at the spot desired to work upon. In a few minutes the action of the current will soften the iron or steel to such an extent that it will be comparatively easy to cut. If the burglar is an electrician, he can utilize the electric light wire for the purpose.

CROSS COUNTRY ELECTRIC RAILROAD.—The experiments which have attended city passenger traffic have succeeded so well that efforts are now to be made to apply electric propulsion to cross country roads. The first experiment is to be made in Minnesota, between Stillwater and St. Paul, 25 miles. It is intended to have the road in operation for both freight and passenger traffic by October 1st. It is said that power is to be obtained from Niagara Falls for operating an electric railway which Rochester capitalists propose to build. The road is to be 80 miles in length.

METALS BY ELECTROLYSIS.—It may not be generally known, says a London electrician, but it is important that it should be, that metals deposited by electrolysis do not adhere well, if at all, to their kind; thus electro-deposited gold will not adhere to gold, silver to silver, nickel to nickel, nor copper to copper, and so on.

THE MANIFOLD USES OF ELECTRICITY.—Electric motors have been applied to upward of 140 different uses, and the number is still increasing. The sizes of the motors include those of from a mere fraction of a horse power up to one of 5000-horse power, which is in operation near London, Eng.

ELECTRICAL FIREWORKS.—An electrician who has made a specialty of spectacular electricity says the day is not far off when electrical fireworks will supersede those now used.

AN EXPERT ELECTRICIAN insists that an electric train, making 125 miles an hour, would require 7000 feet—over one mile—in which to come to a standstill.

ENGINEERING NOTES.

Unsinkable Ships.

With the advancement that is being made in every other line of industrial and commercial development, there has come a demand for improvements in the construction of vessels and ships, which are becoming more and more an important factor in our commercial relations, not only among ourselves, but with foreign nations. Many improvements have been made which have made modern ocean travel more safe, speedy and reliable, but so far no feasible plan has been suggested by which a vessel would be made practically unsinkable. In this, as in many other instances and improvements, it has remained for Yankee invention and ingenuity to work out and demonstrate such a plan.

Capt. Meacom of Chelsea, Mass., has recently patented an invention which promises to be of great importance in the future construction of ocean-going vessels, and his invention is briefly described as follows:

"He has developed a double-hulled ship with compartments so arranged and constructed that it supplies a mathematical certainty against sinking. Between the outer and inner shells of his vessel is a series of longitudinal compartments, to be filled and emptied with water by the vessel's pumps, for ballast. Above this section on either side, and rising to the full height of the vessel's sides, is a series of chambers filled with small air-tight tanks, their capacity being figured in excess of the known displacement of the ship and cargo. Thus a cubic foot of air has a perfect supporting capacity for a known weight. If the supply of air in these tanks is 25 per cent above that required by the formula, nothing short of fragmentary destruction could sink a vessel. Any probable collision, the penetration of a shot or the explosion of a torpedo would injure only a small proportion of the air-tanks, and the rest would easily and safely perform their work."

A vessel thus equipped would be practically non-sinkable. It would, of course, have a less carrying capacity; but in passenger steamers and warships, where safety is especially desired, the sacrifice may well be made.

CANAL BUILDING seems to have entered upon a new phase of activity. Scarcely a month passes that does not bring out some new canal enterprise or revive an old one. Ship canals appear to take the lead. The present coast defense discussion appears to have revived the talk of canals between Philadelphia, Baltimore and the sea coast nearly as much in the light of war measures as for greater commercial facilities. A New Jersey canal of considerable length is also discussed. Scotch capitalists are thinking over a plan to dig a canal through the land of oaks, joining the Atlantic and the North sea. Like nearly every engineering project of recent years, the scheme is entirely practicable, provided enough money can be secured. Often, however, the enthusiastic support of such plans comes from men who see in their success a furtherance of their own financial well-being rather than a return to the investors. A long canal necessarily buys a great deal of material and employs a large number of men.

SAN RAFAEL CANAL.—A canal is being constructed from tide water to the broadgauge depot in San Rafael. On each side of the canal will be a levee five feet in height above the marsh and 30 feet in width. At the broadgauge depot the width of the canal will be 90 feet, allowing ample room for echonere to turn. For the rest of the distance the canal will be 52 feet wide. The bay shore is to be protected by a levee four feet above high water and 40 feet wide, the surface to be used as a roadway. The length of the levee will be about 4 miles, starting at the broadgauge depot and terminating at a point near the high bluff at Point San Quentin. The canal will be about three miles long, about one-third of which length has already been completed.

RAPID RAILWAY TRANSIT.—It is said that a company has been organized, with a capital stock of two and a half million dollars, to put to a practical test the Weems electrical railway system. This system is the result of the experiments on high speeds by E. T. Crohey, who was the first engineer to attach a high-speed motor to the axle of a car, and at a recent test the incredible speed of 130 miles per hour was obtained from a car ten feet long and two feet high upon a two-foot gauge track. The car was pointed to lessen the air resistance and contained nothing with the exception of a set of instruments that showed a much less resistance from air than had been supposed.

A GERMAN engineer has devised a new method for fixing a foundation under water. By means of a powerful blast of compressed air he drives powdered cement down into the sand or mud at the bottom of a stream. The action of the water immediately fixes the cement, and it becomes like solid rock.

THE Hudson River Tunnel is within about 3400 feet of the 5400 feet necessary for completion and is progressing at the rate of ten feet a day.



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SAN FRANCISCO:

Saturday, May 30, 1891.

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[NEW THIS ISSUE.]

Assessment Notice—Inyo Marble Company.

Attorney-at-Law—E. A. Belcher.

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Passing Events.

Among the notable events of the past week was the fine shower that visited this section of the State on Wednesday morning. The rain continued for about two hours, falling part of the time quite heavily. This is an occurrence not usual so late in the season. While this rain damaged somewhat the hay in process of curing, also the strawberries slightly, it helped the grass, everywhere still green, refreshed the gardens and lawns, benefiting at the same time the ripening fruits and the later maturing crops of grain. As a means of laying the dust, this shower was welcomed by the denizens of San Francisco, it having accomplished a feat that our municipal authorities never so much as undertake.

The preliminary work of the World's Fair seems to be making satisfactory progress. The erection of the big buildings is about to be commenced, and many foreign Governments have signified their intention to take part in the great show.

Our local labor troubles, instead of meeting with abatement, as hoped for earlier in the year, appear to be multiplying as the season advances, causing much loss to both employers and workmen, as well as serious incon-

venience to many other classes of the community. Many branches of business are suffering severely from this cause, which, if continued much longer, will tell with damaging effect on all our industries, driving away trade and checking building operations and improvements of every kind. It is a pity some plan cannot be hit upon for obviating these troubles or insuring their ready adjustment when they do occur.

The Future.

Sir Charles Dilke, in a recently published work in two volumes, entitled "The Problems of Great Britain," expresses the belief that in the future the world will be practically divided between the Anglo-Saxon, the Russian and the Chinese. If the present rate of increase both in numbers and wealth is kept up, the French and German nations will appear as plumes beside the all-conquering Anglo-Saxon. The German surplus of population has largely overflowed into boundless America, and to all intents and purposes becomes Anglo-Saxon. How many millions of people there are in the United States whose names alone indicate their Gallic or Teutonic origin. How many more in Great Britain and her provinces. Had Sir Charles Dilke's prescience reached far enough, might he not have made the statement that the Anglo-Saxon is the coming race? Russia, it is true, while old in years, is young in progress. Her awakening is that of a young athlete. Her power is physical. Something more is needed if she is to keep step with the Anglo-Saxon and rule the world or divide it into three parts; yet Sir Charles Dilke's predictions may be verified if Russia is content to work out the possibilities of her now practically endless domain. The autocratic rule of the house of Romanoff will be modified before the next generation has passed away. Then, and not before, Russia's future greatness or weakness may be foretold.

We may fairly suppose that Sir Charles Dilke sees the Chinese through other lights than we who know them as a sort of human teredo.

China has vast areas of unoccupied territory which will in time be occupied, if not by Chinese, perhaps by Russians. China, unlike other nations, loses nothing to the Anglo-Saxon through emigration; wherever a Chinese emigrant is found he is a Chinaman. If the great wall of China is ever rebuilt, it will be done by the rest of the world; its purpose will be to keep the Chinese in and a thorough job will be made of it.

The World's Want is More Money.

Mr. Goschen, Chancellor of the British Exchequer, advises the issue by that Government of one-pound notes, and also of 20-shilling notes secured by silver. No bank of England note has yet been issued for a less sum than five pounds; both these propositions are a new departure in British finance. It shows that Mr. Goschen, at least, fully realizes the fact that the increase of money has by no means kept pace with the world's requirements, and that something besides gold must be used as a money base. It shows also that silver will be used to supply this basis for more money.

Money-lenders and all who trade in money and prosper best when money is tight and "times are hard," have and will continue to oppose an increase of circulating money because it suits their present selfish purposes.

The farmer, the miner, the manufacturer—those who need money to carry on the industries and commerce of the world and to develop new industries—need money at reasonable rates of interest. They do not so much exercise themselves about the security back of this money, if only it have the good faith of the Government issuing it, though all agree that silver, which has served so long and well, properly supplies the want. The gold advocates, or rather the opponents of more money in this country, know that if any other basis than gold is used to increase the circulating medium it will be silver, therefore their whole effort has been directed against silver. They have counted on England's financial policy as backing of the first order, and it would seem as if this proposition of Mr. Goschen must be a knock-out blow for them.

We have no need of land notes or any other form of money in this country than gold and

silver if we fully utilize our resources of these metals, and there will be enough for England as well.

For the Benefit of the Miners and Their Friends.

Notwithstanding more effective means for preventing accidents in mines are all the while being devised, the occurrence of this class of casualties seems to be as frequent as ever. Relatively this is not perhaps the case, there being, of course, a constant increase in the number of men employed at this business. But even in this view of the subject these accidents are all too frequent, suggesting that suitable measures be taken for mitigating their consequences as far as may be. Since we cannot prevent the miner from being disabled and sometimes killed outright, we should devise some plan whereby those dependent on his labor for support would not, in case of disaster, be left wholly destitute.

A bill having been introduced into the British House of Commons designed to make the insurance of the Scottish miners compulsory, the expediency of extending this rule to the English miners as well is now being discussed in that branch of Parliament. This bill provides that the owner or lessee of the mine shall contribute a small sum on its annual output, and the miners themselves from two to four cents of their weekly earnings, to constitute a fund, out of which a weekly allowance shall be made for the support of his family in the event of the miner being through accident killed or disabled while at work. For enforcing the law and looking after this fund a board of management is appointed, the miners, mine owners and the inspector of mines for the district being represented on this board.

To what extent any such arrangement would, in this country, be practicable or desirable, becomes a question, the conditions here being so unlike those that prevail in older countries. In the latter the miners are less migratory than they are apt to be with us, the most of them following no other parent, and spending their lives in the district where they are born. Being so permanent and bound to the neighborhood by the ties of family and kindred, these men would be much more likely to consent to the payment of a small weekly stipend for the purpose named, than would miners in the United States, who, more widely scattered, and drifting from place to place, could have no surety that the benefits of this fund would be extended to them in case of accident. It was the unsettled habits of this class that prevented their ever combining into a stable and effective union, such as has been possible with most other guilds in this country.

But this is an evil that steadily tends to correct itself. Our miners, even on this coast, where this migratory spirit has been most manifest, are every year becoming more and more fixed, accordingly as the self-employing fields have narrowed, and the life of the prospector held out fewer and fewer temptations. It might, therefore, be practicable to frame a law calculated to subserve the end here contemplated, and the provisions of which would be acceptable to those intended to be benefited thereby. It would, at all events, be well for the newspaper press to discuss this matter, in the hope that such suitable plan be evolved as would, before the next session of our State Legislature, commend itself to both the mining and the general public.

ORE rates from Wood River have been fixed at \$8 a ton to Salt Lake, \$11 to Denver, \$12 to Pueblo, \$14 to Kansas City, \$13 to Omaha and Council Bluffs, and \$14 to Leadville. These rates went into effect May 20th, and should give a fresh impetus to the extraction and shipment of ores from Wood River. No place more abundant in rich silver ores, and by giving to the miners rates that will enable them to ship medium as well as high-grade ores, vast quantities would soon be shipped and both the roads and the miners reap a harvest beyond anything yet experienced in this State.

THE works at the new smelter at Pioche are beginning to assume an air of business, and from present appearances it will be but a short time before the million begins to make its appearance.

THE managers of the World's Fair are still trying to cut wages—perhaps on the principle of the more wages the less swag.

Diamonds.

Where they Occur and How to Search for Them.

Frequent inquiries are being made by placer miners and diamond prospectors, for some simple way by which, without the possibility of mistake, they can tell when they find diamonds in the working of their placers. We have looked over most of the books on the subject of precious stones, but cannot find in any one of them plain directions for that purpose. We often hear of stones, supposed to be diamonds, being sent to London, Paris, and other places for determination denoting that there is much attention being paid to this matter. Knowing that one of our old correspondents, Melville Attwood, F. G. S., had been in the diamond mines of Brazil, we asked him if he could furnish us with the desired information, which he, having kindly consented to do, will be found embodied in the following article:

"I think," says Mr. Attwood, "that the gold and diamond placers of Brazil, like those of California, may properly be divided into three classes:

"1st. The surface washings and the Ravine diggings, which have derived their gold principally from the degradation or breaking up by atmospheric and aqueous agencies of the outcrops of the auriferous veins. The gold found in these placers is mostly angular, with pieces of quartz adhering to it. This class, to a certain extent, has been the most important of the three, as nearly all our richest quartz veins were discovered by working them. For instance, in the Grace Valley district, at Rhode Island Ravine diggings, the first gold vein was uncovered—the Gold Hill. Then the Boston Ravine diggings, the Massachusetts Hill mines, the Allison Ranch diggings, the Allison Ranch mine, the Lamarque diggings, near the north branch of Wolf creek, which uncovered the Enreka, Idaho, etc.

"2d class consists of the recent river-beds, from which the water has been diverted, and the present river-beds. In this class most of the Brazilian diamonds are met with.

"3d class, the ancient river-beds in which diamonds are also found.

"The Brazilian miners distinguish the various diamond placers by the following names: Genpiara, an alluvial deposit whose surface shows it to be the unmined bed of a stream or river. Burgalhao are small fragments of rock, bestrewn the surface of the ground. Casalho, fragments and pebbles of quartz, or rock and sand mixed with clay, forming the bed of a river. Takoa Carza, which consists of the above materials cemented together, forming a conglomerate mass.

"The diamond prospector's outfit, should consist of a light pick, a shovel, and two riddles, one having three-fourths of an inch apertures and 18 inches in diameter, the other having eight holes to the linear inch; a miner's wallet, which is a bag four feet eight inches long by 18 inches wide, with an opening in the middle. It can be carried over the shoulder or used as a saddle-bag. With it a miner can pick 40 pounds of gravel or more for a long distance. A tub for washing the gravel in. This may be got by cutting a wire or barrel in two. A rubber bath-tub will also answer the purpose. A piece of rubber cloth, to be used for sorting the gravel on. A watchmaker's lens of two powers, fitted into a spectacle frame. A placer miner's scale of hardness, consisting of fragments of diamonds, sapphires and quartz, mounted at the end of a penoil. This outfit, with the scale of hardness, can be obtained of John Taylor & Co., San Francisco. The scale of hardness can easily be made, by taking the rubber out from the end of the penoil and filling the space with lapidary's cement, which melts at a very low temperature. Over a small spirit-lamp, warm the fragments of diamonds or sapphires, and while hot, insert them into the cement. By wetting the fingers and rubbing it, the cement can be molded into any shape desirable, and when cold, it will be as firm as if soldered.

"The sample of gravel to be examined must be first put into the coarse riddle and that fastened above the finer one. Then immerse both riddles into a tub of water, and with a half-rotary motion, wash all the fine gravel into the lower one, the dirt and sand passing through into the tub. Then throw away what was collected in the coarse riddle, unfasten it

from the finer one, immerse the latter in the tub of water, and use a jiggling motion till all the heavier portions of the gravel have settled at the bottom. Continue the jiggling, and by raising the riddle a little at one side, you can get all the gravel to the opposite one. Then, with a very quick motion, turn the contents on to the sorting cloth or board, which should be placed near the tub. The heaviest gravel will then be at the top, and can easily be examined and tested; by taking the pencil with the fragment of diamond mounted at the end of it, and pressing lightly, try to scratch the suspected stone, at the same time looking at it through the lens. If no mark or scratch is found upon it, it must be a diamond, no matter what the shape or color.

"The fragments of diamond may be protected from injury by the metal covering used to cover the sharpened end of pencils. In Brazil, as yet, no mines have been discovered like those in South Africa, such as Kimberley, De Beers, Du Toit's Pan, and Bultfontein, where the diamond's may be said to be found in place."

Mr. E. I. Dunn, in a paper read before the London Geological Society on the African diamond mines, says: "That the old mines are 'volcanic pipes,' and that they have burst through these carbonaceous shales, is evident. Is it not reasonable to infer that the carbon, indispensable in one form or another to the formation of the diamond, was supplied by these shales?"

I think the chances are good that we may yet find in California one of these "volcanic pipes."

In the PRESS of June 25, 1887, and July 9, 1887, will be found a full account of the African diamond mines, with plans and sections of the same.

Wolf's Patent Safety Lamp for Mining Purposes.

On this page we represent the different parts of a miner's safety lamp, very useful in nearly all kinds of underground mining, more particularly, as the use of benzine is a better light, of uniform intensity and does not deposit any lamp black to clog the lamp.

Fig. 1, represents a benzine safety lamp for mining purposes, provided with a device for lighting the same, while it is closed, and with a magnet locking contrivance. Figs. 2 and 3, illustrate the lighting device in full size. It has proved so advantageous, that no lamps are now ordered unless provided with such a lighting device. It is provided with a peculiar locking contrivance, impossible to open, except by means of a particular magnet. Fig. 4, represents such a locking device, located in a case or shell, attached to the screw ring of the lamp.

Fig. 5, shows the best and latest arrangement of the device. Fig. 6, by a scale of, say one-third of the natural size, a lamp for ascertaining the state of the atmosphere in drifts. Fig. 7, shows a signal lamp used in mining surveys. Fig. 8, shows a lamp similar to Fig. 1, of larger size, and with quadruple tubular burner, the light being more intense, and suited to large spaces. Fig. 9, represents an apparatus for testing the above-described safety lamp. Fig. 10, represents an apparatus for filling the safety lamps without danger. Fig. 11, is the magnet to be used to open the lamp. Fig. 9, representing the testing apparatus, is probably the most important, as few safety lamps are made to show absolute safety until placed in use; when it may be too late, as any disastrous accident, resulting from the use of a defective lamp, could have been prevented by using the test, which rejects all but perfect lamps. The operation, a chemical and mechanical one, is a too complicated one to be fully described in this article.

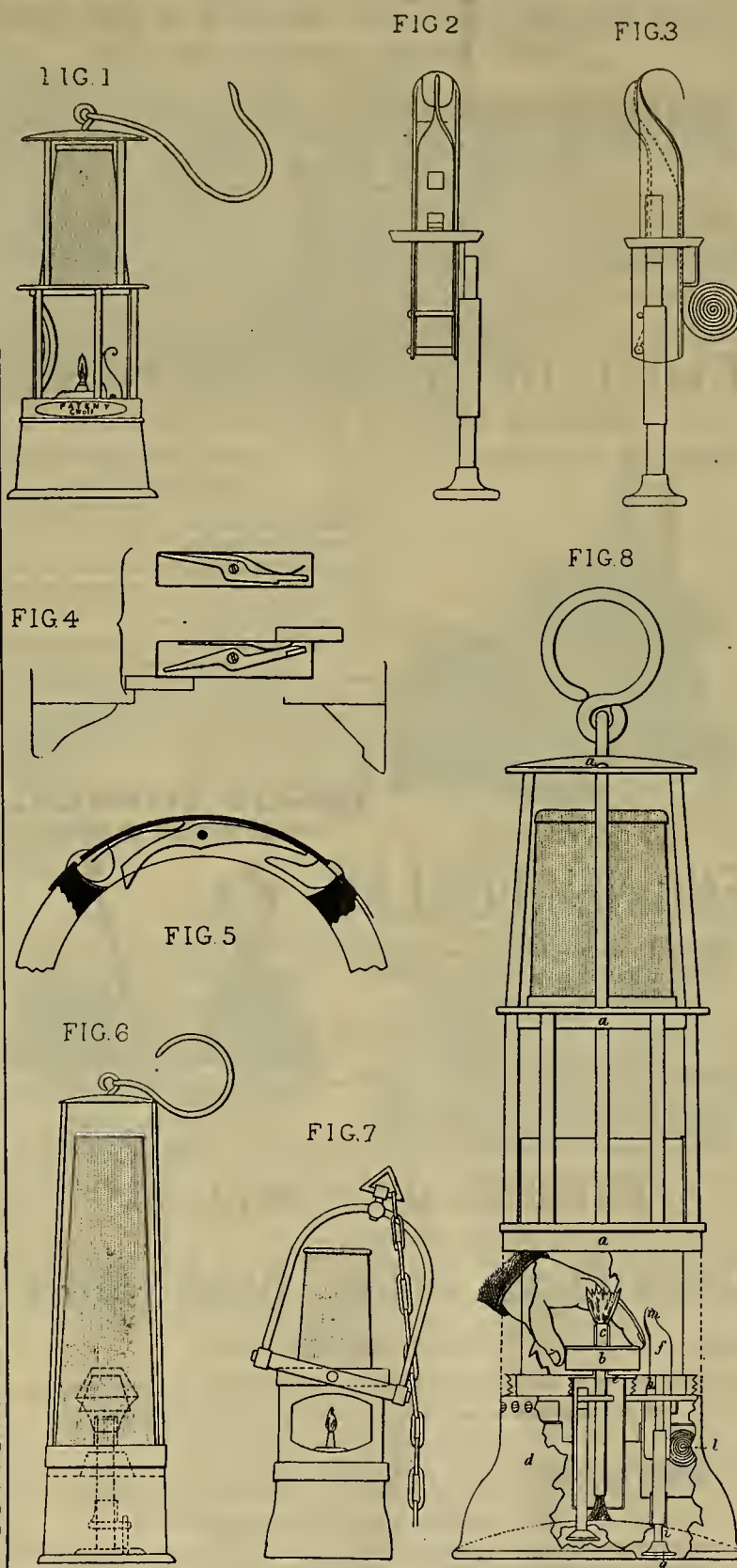
St. Louis, Mo., says the *Danver Industry*, will receive five million dollars this year in dividends from mines of gold and silver. Of this handsome net income, four millions will be derived from the Granite Mountain, Bimetellio and St. Joseph lodes. This is a good showing for a city that is not known as a mining town. It is probable that the mine-owners of St. Louis have made of it a side issue, only investing some of their surplus, while prosecuting some other branch of business, to which they give their personal attention.

The men who are producing these results, however, must be mining men, who are not only miners but business men. It is a well

demonstrated fact that practical success in mining involves the employment of business ability along with a knowledge of the detail of practical mining. The mining industry in St. Louis should be favorably regarded.

THE UNITY MINING CO.—The Unity Gold and Silver Mining Co. has been lately incorporated in this city to work the Skyblue,

ELECTRICITY TO HOIST COAL.—Another practical step in advance in the use of electricity has been made at the Black Diamond mine. An electric hoisting machine has been placed at the top of a slope 450 feet in length, for the purpose of hoisting coal, the top of the slope being 3100 feet from the mouth of the mine. The generator which supplies electricity to the motor attached to the hoist has a capacity of



WOLF'S PATENT SAFETY LAMP.

Crossbow and Daisy Dean mines, located about one-half mile above Middle Creek, on the Sacramento River, Shasta county. The directors of the company for the ensuing year are W. D. Biegle, A. R. Becker, Arnold Becker, P. J. Bughee and J. A. Bouk. The company has already commenced work on the mines, designing to develop them to their fullest extent. Negotiations are now under way, for a plant of the most improved machinery and processes, such as are now used in Australia. It is thought that the introduction of these new methods, in handling the ores, will be of great benefit to the miners of Shasta county.

120 horse-power, and is located at the mouth of the mine, while the motor is capable of exerting 80 horse-power when needed. Yesterday, on a test, 12,000 pounds of coal were hoisted at one trip up the slope in one and one-half minutes. The plant was manufactured and installed by the Electro Engineering Company of San Francisco, under the supervision of Prof. Keith, the inventor, and is pronounced a thorough success. It is claimed that it makes practicable the working of many coal and other mines which could not be so cheaply and effectively worked by the usual methods of steam or pneumatic transmission of power.

The Deadly Open Car.

Certain Boston officials, claiming to act in the interests of the public health, have sued out an injunction to restrain the street railroad companies from running open cars into the suburban districts. And what think you, reader, is the reason assigned for this restraining measure? Simply this, and nothing more: If these open cars are allowed to be run, people riding on them will through such exposure to the open air, be liable to take cold and thus invite an attack of the grippe, and ailments of a like kind! This is considerate but exceedingly stupid, the only way whereby people can escape these bronchial troubles being through outdoor exposure, to fortify themselves against them.

Who are the people that suffer most from maladies of this kind? Always those who live in unventilated rooms, ride in closed cars and in other ways seek to protect themselves from the least breath of air. The street gamin, with his bare throat, never has the grippe, nor are outdoor laborers of any kind apt to suffer from this or similar complaints. Wind alone hurts no one, if warmly dressed.

The passenger who thus protected cannot, in fair weather, ride on an open car, however strong the wind, had better make a will and order a coffin. And here it may be proper to observe that on this coast the common mistake is made of wearing too warm underclothing. As a rule, when additional clothing is required, it should be in the form of an overcoat or other outer garment. Wearing constantly thick drawers and undershirt, as we usually do here in California, is exceedingly debilitating, the system through this practice becoming so tender that colds are contracted on the least exposure. No hardy or long-lived race need be looked for if this habit of bundling up the person and avoiding the fresh air is to be adhered to.

The fact is, air starvation has killed more of the human race than any other form of famine. Shutting out what is called a draught has delivered over to death more victims than war or pestilence. Through lack of ventilation we deliberately convert our houses and schools, our courts and workshops, and even our places of amusement and worship into veritable "Black Holes," spending often a good deal of money to thoroughly exclude the life-giving element. Our great hotels are prison pens, almost as deadly as Andersonville or Libby, so effectually is the pure air shut out and the vile air shut in.

We trust the denizens of the "Hub," following the example of the people on this side, will insist on having enough open street cars to accommodate the advocates of free air, with always a compartment for the over delicate and wheezy, putting on an inclosed but properly ventilated car for the use of all in stormy weather.

The Tariff on Lead Ores.

If Colonel R. M. Moore is correctly reported in the *Eagle Pass Guide*, he is entitled to the compliment of having expressed more good sense than any other official on this subject. That paper says: "Colonel R. M. Moore, special agent of the United States Treasury Department, has just returned from an extensive survey of Mexican mines, and his observations have convinced him of the needlessness of attempting to prohibit the mixing of ores unless by the total prohibition of their importation. Ores of many different grades and classes are often found in the same mine, in the same shaft, or even in the same vein. Whenever these ores are mined, they are so far concentrated—separated from the surrounding or intermixed valueless rock. Thus the literal construction of the terms of the rule would exclude all Mexican ores from importation, while it is practically impossible to agree upon the amount of latitude to be allowed in construing them. Under these circumstances, Col. Moore thinks the only rational remedy lies in such a change in the laws as will do away with the attempted classification of ores, and levy upon all lead in the ore the same tax, regardless of the classification of ores or the relative quantity of the metal."

If a man could live a thousand years he would probably spend the last 50 fretting over what he might have done in the previous wasted time.

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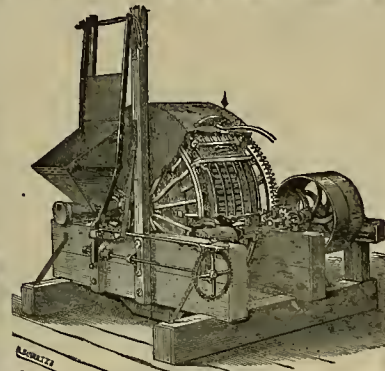
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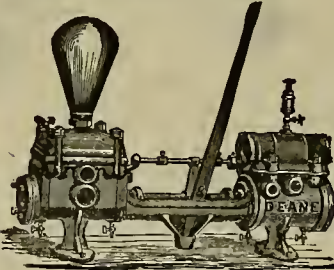
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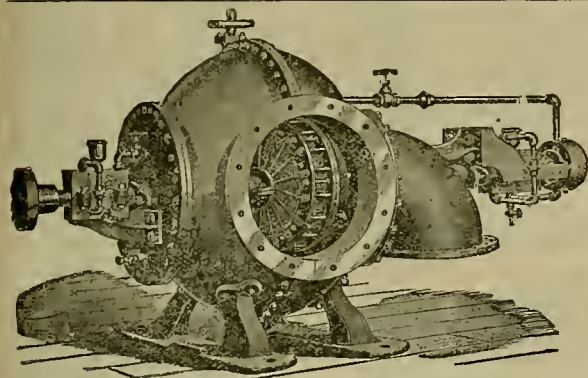
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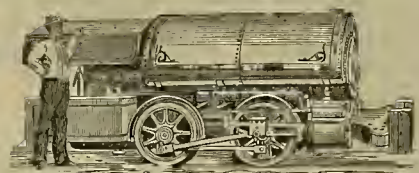
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an idea of its scope.

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silver, with heat and water, acid or blow pipe. In speak-
ing of testing for a process, the extent and richness of
ore is considered, smelting ores, selecting and working
samples, appliances for testing, roasting, etc. Under
the head of "Working Ores" the author describes Aaron's
process, has something to say of superheated steam, pre-
paration of chloride of copper and coprolite of cop-
per, use of copper and iron, quantity of chemicals, car-
bonate of lime, chloride ores, amalgam, Patchen's pro-
cess, etc. He also describes the methods of working
roasted ores, treatment of base metals, stirring, heat of
furnace, want of sulphur, etc. Under the head of
"Leaching Processes" are the titles Smelting, Mexican
process, Chilean process, Crocker's process, etc. Under
"Pulverizing Machines" are described the various mill
construction and operation, stamp batteries, screens,
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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, May 28, 1891.

Cool, foggy weather gave way to a rainstorm, which, though general, was of short duration—doing no harm. The grain crop will unquestionably be the largest on record, with the berry averaging plumper. With large crops and better prices than for years, the outlook is all that can be desired in all branches of trade. The outflow of gold at the East since January 1st aggregates fully \$500,000,000, and that no serious financial results have followed, hardly a ripple, speak volumes in favor of the high standing, financially, that this country has secured. There is not a country in the world that could have done it. Much of the gold sent out was in payment for American securities bought by Eastern operators for a large speculative boom this fall and winter, based on the prosperous condition of the country. Strikes at the East are fewer. All things appear to be settling down to a more legitimate and of necessity prosperous basis.

MEXICAN DOLLARS—The market is quiet at 77 7/8 cts.

QUICKSILVER—Receipts the past week aggregate 133 flasks and exports 360 flasks to Mexico. The market is essentially unchanged.

SILVER—The market has held at fairly steady prices. After next month the Mint will not coin bullion only as requested, but the 4,500,000 ounces of monthly purchases will be continued. The writer still adheres to the opinion that the market will do much better before the end of the year. At the present low prices operators are buying securities, governed by the price of silver, for higher prices when the latter advance. There is no evidence that any European nation is letting go of its silver, but there are unmistakable signs that opinion is steadily setting in its favor. At the East silver is coming more generally into use. Official statistics show that payments in silver certificates and Treasury notes in the first ten days of May amounted to 64.5 per cent of all payments of customs duties at New York, payments in United States notes to 10.8 per cent, and payments in gold coin and certificates to only 24.7 per cent. A year ago the proportion in May was 93.8 per cent gold, 2.6 per cent silver and 3.6 per cent legal tenders. Taken by itself, this change certainly merits attention. When the time of year arrives for large shipments of funds from New York to the agricultural States, with which to move crops, silver will undoubtedly be a rare article. The wheat crop this year is placed at 500,000,000 bushels (about 1,000,000 bushels more than it was in last year) and cotton at 8,500,000 bales, while corn and other cereals promise larger returns than in 1890. To move these, large sums of money will be required, and silver and silver certificates will come in good play.

LIME—Receipts the past week aggregate 4378 bbls, and exports by sea 430 bbls. to Honolulu. The market is essentially unchanged, although it is stated that slight concessions are obtainable from one or two agencies.

LEAD—The market is fairly steady. The demand is good for the season. It is said that at present prices, and the low freights from England, shipments can be made from that country.

TIN—Our market is reported unchanged. Eastern advices report heavy stocks of plate, more than enough for at least a year to come. Pig tin in Europe is stronger owing to a lessened output and a fair demand. Plate in England is easy.

IRON—It is claimed that notwithstanding the large stocks here, the shipments on the way are quite heavy. These shipments are largely induced by the low freights to this port. The consumption on this coast is said to show a much larger volume than at the same time in 1890. At the East the consumption is enlarging. According to cablegram to Iron Age, there is quite a speculation movement in warrants in England.

COPPER—The market is far from satisfactory. Of necessity when the market drags, consumers take sparingly; this is the present condition at the East and also abroad. New York is reported weak with Lake selling below 13c, Arizona below 12 1/2 c, and casting brands 11 to 11 1/2 c.

COAL—Imports the past week aggregate as follows: Coos Bay, 1350 tons; Departure Bay, 2500; Seattle, 506; Baltimore, 1046; Nanaimo 4000. Total, 9356 tons. The market continues unsatisfactory to the selling interest. The stock on hand is large, while shipments from England are exceedingly large, as they are also from Atlantic ports. Australia will soon begin to increase her shipments as the wheat surplus there is well provided for. Our exceptionally large crop of wheat is causing vessels to seek this port, and coal is largely used for cargo.

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Wellington.....\$10 00	Australian.....\$ 7 00
Greta.....	80 Liverpool Sfm..... 7 00
Carbon Hill.....	80 Scotch Splint..... 7 00
Nanaimo.....	100 Cardiff..... 7 00
Gilman.....	7 50 Leigh Lump..... 14 00
Seattle.....	7 50 Cumberland h.k. 10 00
Coos Bay.....	6 00 Egg, hard..... 12 00
Cannel.....	9 50 West Hartley..... 7 50
Egg, hard.....	14 00
Cumberland, in sacks 14 00	
do, hulk.....	13 00
Wenden.....	9 00
Scott Splint.....	8 50
Rynbo.....	8 50 To load..... \$12 00
West Hartley.....	8 50 Spot, in hulk..... 14 00

Coke—English.

Eastern Metal Markets.

By Telegraph.

New York, May 28.—The following are the closing prices the past week:

	Silver in	Silver in	Copper.	Lead.	Tin.
Thursday.....	44 5-16	97	12 90	4 32	20 40
Friday.....	44 1/2	96 1/2	12 80	4 32	20 30
Saturday.....	44 1/2	96 1/2	13 00	4 32	20 30
Monday.....	44 1/2	96 1/2	13 00	4 32	20 30
Tuesday.....	44 1/2	96 1/2	12 90	4 32	20 35
Wednesday.....	44 5-16	97	13 00	4 35	20 25

Borax is steadier. Tin is a shade easier. Lead is strongly held. Copper is irregularly weak. Iron has a stronger tone, but is not quotable higher.

Mining Share Market.

Mining shares the past week moved in a peculiar manner. While North End stocks held weak and apparently sold down, Middle and Gold Hill stocks gradually gained strength. This seeming anomaly indicates that, in the recent active movements, the pool sold considerable North End stocks, but had to take in large lots of the others. The writer still has faith in the market, and has reason to believe that a person who buys stock and pays cash and will not be afraid of either a small decline or an assessment, provided either or both come, will come out considerably ahead. This, of course, has reference more particularly to stocks that did not move up during the recent deal. There are many well-informed and successful operators who look for a big deal this fall, based on larger ore development than has been made for several years. While this may be the case, yet experience has taught dealers not to wait for too big a boom (always put out for a purpose), but sell when a 50 or 100 per cent profit is in sight. They have learned also by experience to buy for cash only and not sell if prices go down, for they know that it is only a question of time when they come up again.

All information at hand warrants the belief that at the East a movement has been underway for several weeks, if not months, partly looking to a big bull campaign this fall in railroad securities, and that a powerful moneyed syndicate has been and is still buying all the American securities Europe has for sale, well knowing that America's large crops and the railroads higher freight and passenger rates will admit of dividends the paying of which will allow the syndicate to unload at a large profit. In this move it is thought the mining stock pool or trust company will take a hand and bull up their securities. As a preliminary to this, Jim Keene is being pushed to the front at the East, with this coast Maurice Schmidt who is held in reserve, with Crocker and two or three other first class brokers will come more prominently forward. But of this move more will be known later on, for it is said that there is a strong clique or pool combined to fight the old manipulators, mine managers and mill ring.

Con. Virginia will carry over from this month a surplus, after all expenses are paid, of at least \$200,000. Chollar is more than paying expenses. Overman is accumulating a surplus. Con. Imperial bullion product aggregates about \$10,000 in coin, which about pays expenses. Yellow Jacket will soon be a larger producer. Crown Point, Challenge, Seg. Belcher and two or three more stocks are to be assessed in next month.

News from the Comstock mines is not only confirmatory of the good advices heretofore published, but it also points with unerring certainty to the opening up of a large ore body before the end of this year, but where, no one has as yet been able to satisfactorily answer. The writer believes it will be in the mine in which the pool owns all or about all the stock. In Union, progress is making to pump out the mines. On the 2400-foot level, there is a large body of rich ore. Active work in Ophir, Mexican, Union and Sierra Nevada develop the 1465-foot level to the west, where rich ore has been found in two of them. In Con. Virginia, attention is still attracted to the 1100-foot level. Of course this is to throw outside dealers off the track. The company is accumulating a large surplus fund so as to resume dividends in July next, if not, but hardly likely, sooner. In Best and Belcher, they are doing more interesting work. In Hale and Norcross and Savage, the powers that be, continue to blind operators regarding important work that has been and that is being done. In Chollar, they ran into a 50-foot ledge lying west of the Comstock west wall. Our advices indicate the ore much richer than the managers wish to have known. In Potosi and Bullion, it looks as if the managers are about ready to show up some ore so as to make another deal. They can do this at any time desired, so as to collect assessments, probably for future inside assessment dividends. Work is progressing favorably in the Ward shaft to develop the mines contingent to it. Quiet reports are being put out about a strike of rich ore in Challenge. In Yellow Jacket, arrangements have been made to crush more ore. The ore that is being taken out is gold-bearing, and assays from \$40 to \$80 a ton; but it is hardly likely it will go over \$20, if that in battery assays, the balance going elsewhere—certainly not to outside stockholders. The work in Crown Point, Belcher, Seg. Belcher and Overman deserves close watching.

It is said that Col. Mackay has succeeded in getting control of the Yellow Jacket, Crown Point and Belcher. From outside mines, all news set strongly in favor of the belief that a good up move is near at hand.

Scientific and Educational Lectures.

The following is a partial list of subjects which Rev. John Dickinson, of University P. O., Los Angeles Co., is prepared to treat:

1. A Hurried Glance at Mother Earth.
2. A Closer Look at the Earth's Crust.
3. Minerals—Their Chemistry and Geometry.
4. The Moon.
5. The Geology of the Stars.
6. Evolution—What, Whence, Whither?
7. Some Readings from Nature's Great Stone Book.
8. A Winter in the West Indies.
9. Science Teaching in Schools.
10. Literature Teaching in Schools.
11. Biology. (One, two, three or four lectures.)
12. Physical Conditions of Success in Teaching.
13. Psychology as Related to Physiology.
14. Botany in the High School.
15. Zoology in the High School.

The first eight numbers are better adapted for evening public lectures, and are of general interest. The remainder are more suitable for special institute work.

Knowing Mr. Dickinson (who is a brother of the celebrated lecturer, Anna E. Dickinson,) long and well, we would recommend county or city school superintendents, lecture committees, Chautauque Circles, or other persons who may desire single lectures or courses of lectures on scientific subjects, to correspond with him for further information.

MINING SHAREHOLDERS' DIRECTORY.

COMPILED EVERY THURSDAY FROM ADVERTISEMENTS IN THE MINING AND SCIENTIFIC PRESS AND OTHER S. F. JOURNALS.

COMPANY AND LOCATION.	NO. AMT.	LEVIED.	DELINQ.	TAXES PAID.	SECRETARY.	PLACE OF BUSINESS.
Caledonia S M Co., Nevada.....	44	15c	May 2, June 4, July 5	1	A S Groth.....	414 California St
California Iron & Steel Co., California.....	5	35c	April 27, June 6, July 27	1	F Bonancina.....	438 California St
Carmelo Land & Coal Co., California.....	3	50c	April 11, May 16, June 16	1	W T Baggett.....	344 Pine St
Collins Co., Nevada.....	51	5c	Apr 6, May 13, June 13	1	W L Miller.....	309 Montgomery St
Con Imperial M Co., Nevada.....	51	5c	May 6, June 11, July 11	1	O McCor.....	331 Pine St
East Sierra Nevada M Co., Nevada.....	2	5c	April 14, May 22, June 15	1	G R Spinyer.....	310 Pine St
Egg Eagle M Co., California.....	23	3c	Apr 3, May 18, June 9	1	A W Barrows.....	303 California St
Gnassucan & Cal M & Co., Honduras.....	5	\$5.00	May 12, June 11, July 1	1	Edward Oliver.....	Montgomery Avenue
Idelwild M Co., California.....	2	10c	May 1, June 1, July 1	1	E F Stone.....	336 Pine St
Indian Creek L & M Co., California.....	2	8c	April 7, May 11, June 1	1	S O Mills.....	418 California St
Live Oak Drift Gravel M Co., Cal.....	13	21c	Apr 15, June 2, June 22	1	Joe Morio.....	328 Montgomery St
Inyo Marble Co., Nevada.....	13	10c	May 28, July 10, July 23	1	G W Luce.....	132 California St
Midas M Co., California.....	2	10c	April 27, June 5, June 23	1	A H Ryan.....	323 Montgomery St
Nasajo M Co., Nevada.....	20	10c	May 25, July 17	1	J W Pow.....	310 Pine St
Oak Cons M Co., California.....	8	4c	April 6, May 13, June 10	1	E J Halsey.....	250 Montgomery St
Peerless M Co., Arizona.....	16	10c	April 24, May 29, June 18	1	A Waterman.....	309 Montgomery St
Silver Hill M Co., Nevada.....	28	20c	April 23, May 28, June 18	1	D C Bates.....	309 Montgomery St
Scorpion S M Co., Nevada.....	26	15c	May 22, June 15, June 18	1	G R Spinyer.....	310 Pine St
Sierra Nevada S M Co., Nevada.....	39	10c	May 13, June 17, July 7	1	E L Barker.....	303 Montgomery St
Union Cons S M Co., Nevada.....	43	30c	May 11, June 22, July 13	1	A W Barrows.....	303 Montgomery St
Utah Cons M Co., Nevada.....	12	25c	May 6, June 12, June 30	1	A H Fish.....	309 Montgomery St
Valley View M Co., California.....	4	20c	April 13, May 18, June 8	1	W T Gunnelt.....	308 Pine St
Yellow Jacket M Co., Nevada.....	48	50c	April 14, May 16, June 20	1	W H Blavett.....	Gold Hill

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Alaska Treadwell G M Co.....	A T Corbin.....	420 Montgomery St.	Annual.	June 13
Calistoga Cons M Co.....	H S Fitch.....	331 Pine St.	Annual.	June 1
Caledonia G M Co.....	A Chennant.....	230 Montgomery St.	Annual.	June 2
Clara M Co.....	A Chennant.....	333 Montgomery St.	Annual.	June 1
Crown Point M Co., Nevada.....	J Newlands.....	329 Pine St.	Annual.	June 1
Pinol Cons M Co.....	A Chennant.....	328 Montgomery St.	Annual.	June 1

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M Co.....	J Wetzel.....	320 Sansome St.	40.	May 15
North Banner Cons M Co., California.....	T J Mitchell.....	Grass Valley.	50.	Apr 30
North Star M Co., California.....	D A Jennings.....	401 California St.	50.	Apr 8
Pacific Coast Borax Co., California.....	A H Clough.....	230 Montgomery St.	1 00.	May 11

Recent Additions to the State Mining Bureau. Table of Lowest and Highest Sales in S. F. Stock Exchange.

NAME OF COMPANY.	WEEK ENDING May 7.	WEEK ENDING May 14.	WEEK ENDING May 21.	WEEK ENDING May 28.
Alpha.....	1.20	1.50	1.25	1.50
And.....	1.10	1.20	1.15	1.30
And.....	1.45	1.42	1.50	1.40
Belcher.....	2.50	3.25	3.80	3.40
Belle Isle.....	6.00	6.00	6.00	6.00
Best & Belcher.....	7.25	9.37	6.25	8.50
Bullion.....	2.35	3.45	2.25	3.50
Bodie Co.....	1.10	1.30	1.20	1.35
Bulwer.....	.35	.40	.45	.30
Commonwealth.....	1.55	1.00	.85	1.00
Con Va. & Cal.....	14.12	20.50	15.75	19.50
Chollar.....	3.25	2.75	2.50	3.00
Chollar.....	2.65	3.53	2.30	3.95
Confidence.....	6.50	6.75	6.50	6.50
Con Imperial.....	.20	.28	.20	.25
Crown Point.....	.75	.85	.80	.85
Crown Point.....	2.40	2.90	3.00	2.75
Crocker.....	.20	.20	.25	.15
Del Monte.....	.25	.35	.30	.35
Eureka Cons.....	.35	.45	.40	.35
Excelsior.....	1.05	.90	1.45	.65
Grand Prize.....	.25	.25	.30	.15
Gould & Curry.....	3.30	4.00	4.00	4.00
Hale & Norcross.....	3.35	4.15	3.20	3.95
John.....	.25	.25	.25	.25
Josiah.....	1.30	1.35	1.40	1.10
Kentuck.....	.30	.50	.75	.45
Lady Wash.....	.40	.40	.50	.25
Mono.....	.50	.70	.70	.45
Mexican.....	4.50	5.37	4.52	5.12
Nasajo.....	.30	.30	.40	.25
North Belle Isle.....	.80	1.00	.80	.65
Nev. Queen.....	.45	.60	.40	.30
Ocidental.....	1.30	1.50	1.30	1.95
Ophir.....	7.12	9.87	12.90	9.60
Overman.....	3.50	3.95	5.40	3.80
Potosi.....	4.25	5.25	4.10	4.55
Peerless.....	.15	.15	.20	.15
Peerless.....	.15	.25	.25	.15
Savage.....	3.35	4.00	3.40	3.85
S. B. & M.....	1.30	1.60	1.35	1.45
Sierra Nevada.....	3.35	4.25	3.30	4.15
Silver Hill.....	.25	.30	.35	.15
Sierra Nevada.....	.50	.50	.45	.45
Union Cons.....	3.95	5.00	4.80	5.00
Utah.....	1.10	1.50	1.30	1.80
Yellow Jacket.....	2.20	3.20	3.45	3.40

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OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

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S. C. CHAPMAN—Tulare Co.
B. F. BERT—Shasta Co.
J. H. P. WILLIAMS—Tulare Co.
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W. M. HILGARY—Oregon.
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E. A. BELCHER, Esq., whose professional card appears in another column of this paper, is a brother of Judge Belcher of the Supreme Court Commission, with whom he was sometime associated at Marysville. Mr. Belcher is an experienced and careful lawyer and gives special attention to mining law and the securing of patents for mining claims.

BACK FILES of the MINING AND SCIENTIFIC PRESS (unbound) can be had for \$2 per volume of six months. (Per year (two volumes) \$5.) Inserted in Dewey's patent holder, 50 cents additional per volume.

Sales at San Francisco Stock Exchange.

THURSDAY, May 23, 9:30 A. M.

400 Andos.....	1.85	250 Mexican.....	3.05
200 Belcher.....	2.10	150 Mono.....	.85
100 Belle Isle.....	.50	100 N Con with.....	.65
650 Best & Belcher.....	3.55	350 North Savage.....	.40
550 Bullion.....	2.65	200 Ophir.....	.45
300 Chollar.....	2.65	200 Occidental.....	1.05
50 C. W. H.....	.35	230 Overman.....	2.75
630 Con Cal & V.....	7.75	350 Potosi.....	4.05
50 Con Imperial.....	1.50	400 Savage.....	2.55
20 Crown Point.....	2.50	150 S. B. & M.....	.45
100 Con D & C.....	2.30	150 Sierra Nevada.....	2.10
450 Hale & Nor.....	2.55	200 Union Con.....	2.40
300 Justice.....	.90	250 Utah.....	.75
350 Lady Wash.....	.25	150 Yellow Jacket.....	3.75

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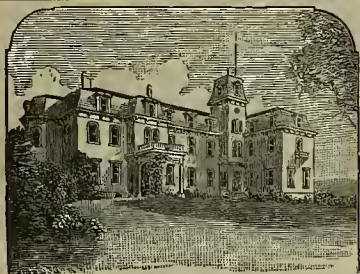
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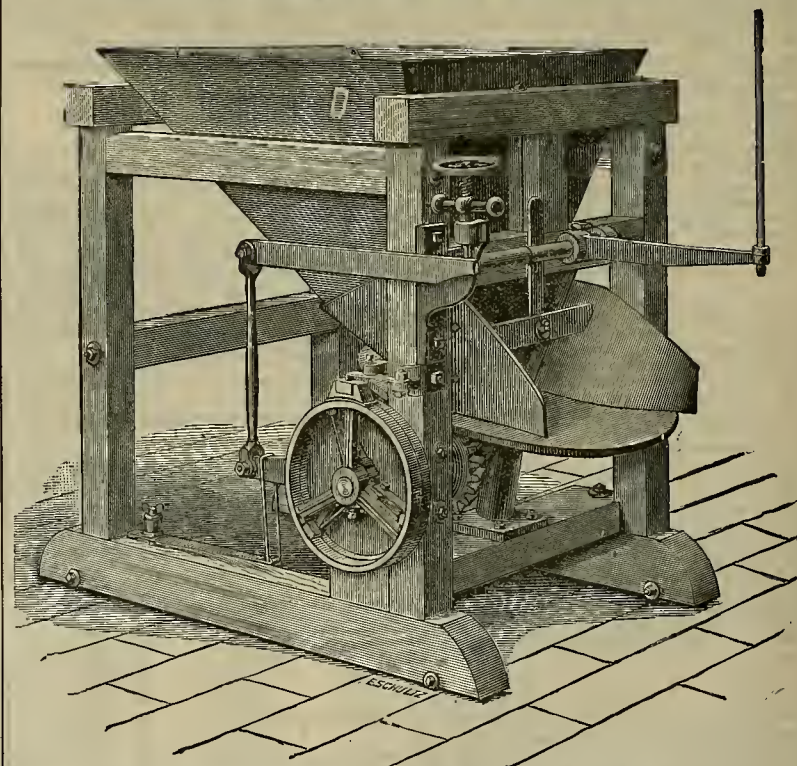
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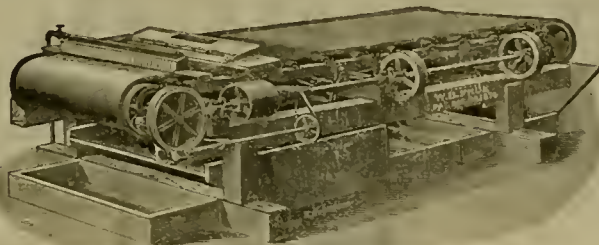
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There are Over 2200 Plain Belt Machines now in Use.

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DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

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The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

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Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Orass Valley, Nevada Co., Cal.

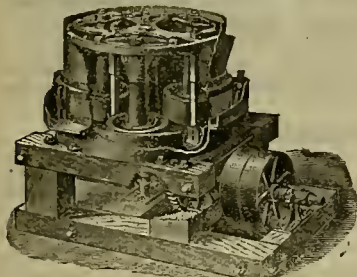
ORASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.

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At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices. DAVID McKAY, JR.,
[Signed] Sup't North Star and Original Empire Mining Co.

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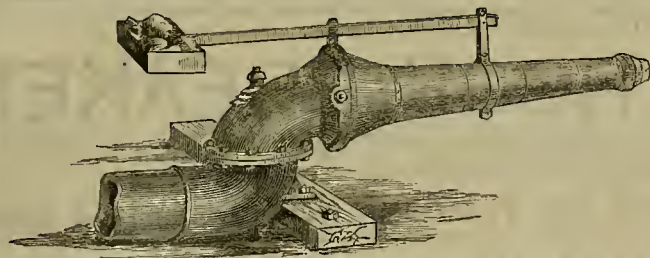
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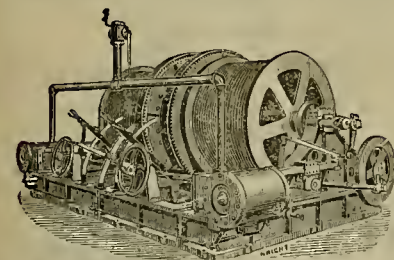
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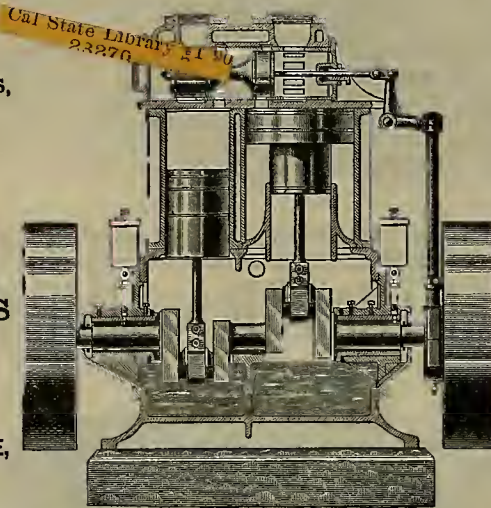
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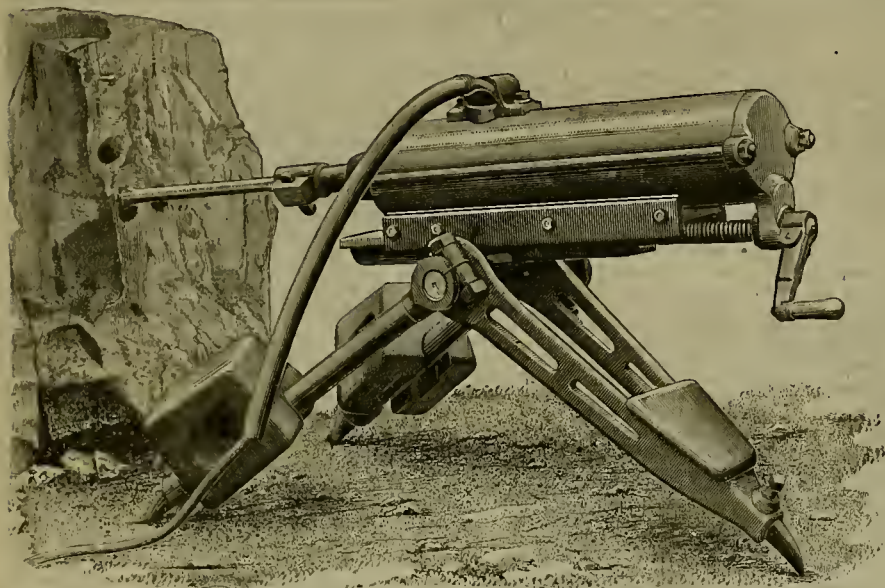
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An Illustrated Journal of Mining, Popular Science and General News.

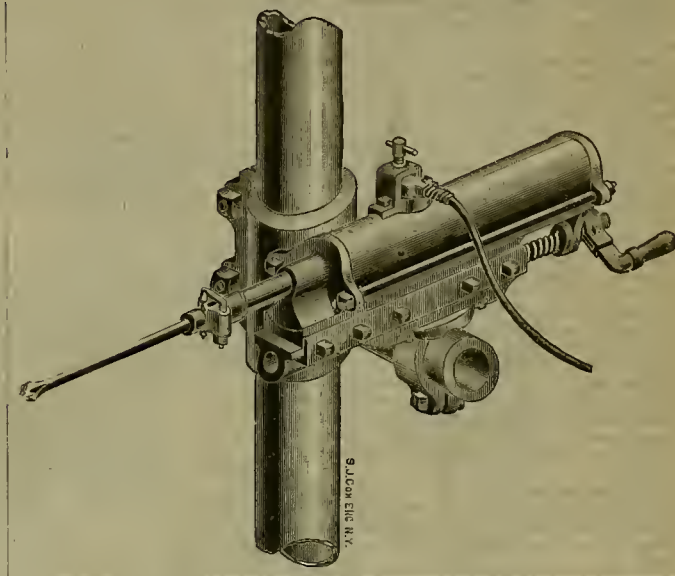
VOL. LXII. — Number 23.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, JUNE 6, 1891.

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EDISON ELECTRIC DRILL MOUNTED ON TRIPOD.



ELECTRIC DRILL MOUNTED ON COLUMN.

Blasdel's Concentrating Belt.

An engraving on this page shows the patent concentrating belt made by the Blasdel Concentrating Belt Co., 419 California St., this city. The peculiarity of this device is that the flanges or edges of the belt stand at an acute angle, inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers, avoiding breakage of the flanges. This belt, at intervals of four feet, has a very slight rifled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it banking on the sides and forming channels through the center. These slight rifles also save very fine sulphurets and quicksilver, which might escape from a belt

with an entirely smooth surface. The cut shows the construction of the belt very clearly.

Electric Percussion Drills.

The introduction of electricity in mining and other underground work has not, until recently, kept pace with its other applications, notwithstanding its peculiar adaptation to just such situations. The reason for this has been that so long as power drills could only be successfully operated by compressed air, it was difficult to convince the mine operator of any material advantage to be gained by the introduction of the electric current so long as he had to maintain at the same time his compressed air plant. A practical and simple electrical percussion drill was, therefore, the key

to the situation. The Edison General Electric Co. of New York, appreciating this fact, obtained full control of an electric drill, which in every way meets requirements, viz., a drill making use of the principles of the "Marron system of percussion tools."

The dynamo is of the ordinary Edison type, and may also be used for operating motors, etc. The moving parts of the drill are confined to an iron plunger without commutator or collector, and there are no electrical connections that can be disturbed by jarring, or affected by moisture or dropping water. The only wearing parts are the guides on which the drill rod works.

Neither an insufficient nor an excessive feed can result in damage to the drill, the peculiar automatic electro-magnet action immediately reducing the stroke to a quiver in case the drill fails to reach the rock, and accommodating its length to suit the situation when the normal stroke is not permitted.

The frequency of the stroke permits of more rapid work with less wear and strain on the bit than in power drills of ordinary type. The drill can be operated or taken apart and replaced by ordinary workmen with no knowledge of electricity.

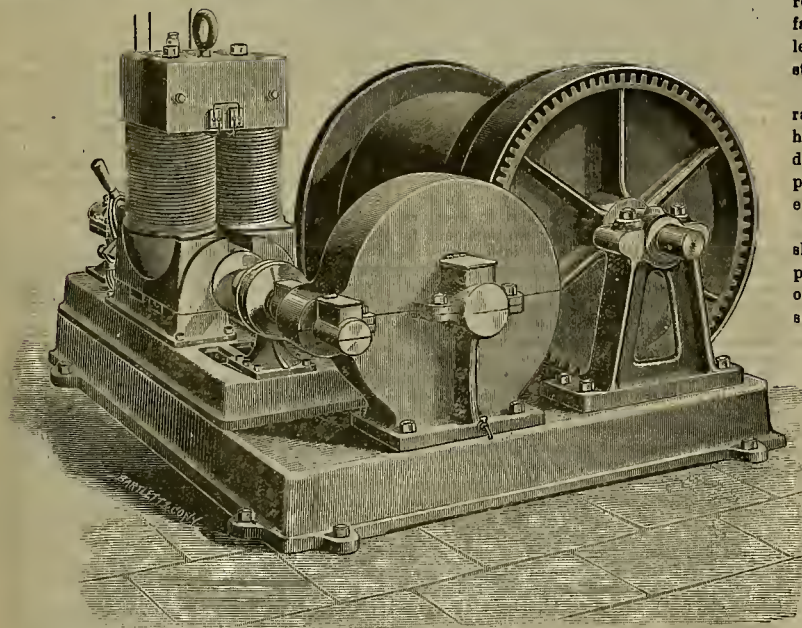
The drill, cuts of which are here shown, consists simply of a reciprocating iron bar impelled up and down by the alternating action of two coils of wire. An iron envelope, consisting of a piece of boiler tube seven inches in

diameter and about two feet long, contains two solid coils of copper wire through which reciprocates an iron bar about two inches in diameter. At the forward end of the machine this bar travels through a long bearing. The outer end of the bar carries a chuck, into which the bit or drill is fastened. The whole is mounted upon a slide with a feed screw for advancing the machine to the rock. The machine is mounted upon a column, tripod or quarry bar, in the usual manner. The ends of the wire coils within the casing are brought to the connecting plugs on the outside of the casing. A flexible cable of any desired length, composed of three insulated stranded wires, leads from the source of electric supply to the drill, and a special connection piece on the end of the cable connects the wires of the cable with the connecting plugs on the drill.

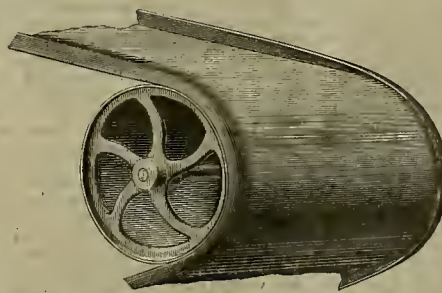
To set the drill in operation it is only necessary to thrust the cable connector into its socket on the drill, the machine then starts. No switch is used. There is no commutating or current shifting in the machine, and nothing corresponding to a valve on an air drill. The shifting of the current from one coil to the other to make the stroke is effected by a peculiar arrangement of dynamo connections and chronites. The drills are operated in parallel; three wires lead from the two drill coils to the generator, comprising two distinct circuits, each circuit including similar coils in the drills. Over these two circuits electrical impulses are sent in alternation. One impulse moves the iron bar or plunger back, and the next moves it forward; thus the drills all move together and in synchronism with the generator. The drill makes about 600 strokes per minute, and the stroke of the plunger is from three to four inches.

The drill will cut at the rate of two inches per minute in the hardest granite with a one and one-half inch bit, and absorbs about five horse power. It is adapted

(Continued on page 60.)



ELECTRIC HOIST FOR MINES.



THE BLASDEL CONCENTRATOR BELT.

CORRESPONDENCE.

We admit, unindorsed, opinions of correspondents.—EBS.

Loss of Gold in Milling.

EDITORS PRESS:—The article of Mr. Phillip Mixsell, of Idaho Springs, Colorado, would have been sooner answered but for my absence. In reply, I will say that if Mr. M. gets 85 and 90 per cent with his mill, working with water, as he states, he does wonders; and here I must express my doubt—not that I question his word, but from the fact that he does not properly sample the ore so as to get the real value. I agree with Mr. M. when he says: "When you get 85 per cent on assay the proof has got to be awful strong to swallow it," and I will add especially when 25 per cent is sulphurets, and especially, again, when the base is zinc, lead and copper. Now, as to his testing, he "takes frequent samples every hour." There is only one absolutely true way to test gold rock, and that is to crush the entire lot you are to work dry, and then sample the entire lot and compare assays with milling results; or, if working wet, run all into tanks and settle until the water passes off clear, and then it will have some gold in.

There is no use of persons flattering themselves that they get 85 per cent of any gold rock by a wet-working battery and use what they may. I am done with stamps, except to crush rock; outside of this they are the curse of the miner—in fact I am about done with wet-working reduction anyhow, and take the stand that all gold ores must be reduced dry. It is about time stamps were thrown one side; they produce more failures than successes, and it is time this dashing, splashing, flooding system of handling gold rock was stopped.

It is all working in the wrong direction, and the vast number of failures and idle stamps is the best evidence of this. There is only one true way to handle gold rock, crush it dry, and manipulate it in slow motioned machines, let them be what they may, and work to get the gold and not to do your heat to splash it about by high agitation so as to run the most passable away. Stamps sometimes pay because their is a large value in the rock, but then they waste as much as is gained unless where gold is very coarse.

You can combat these ideas all you please, you will finally come to dry working. This question of the loss of gold is important to the miner and country, and the more discussed the better.

Mr. Mixsell throws out a very valuable suggestion when he says it would be a great hit if your State geologist would take this matter up and devote part of his most excellent annual report to the different milling plants, and gives us figures upon these different kinds of mills. A full discussion by mill men on this most important of subjects, cannot but prove a great boon to this great and growing industry and I will add, make a critical investigation as to the per cent of metal saved. It would be slow work, but a very valuable one as it would impart information productive of profit.

ALMARIN B. PAUL.

Middle Creek P. O., Shasta Co., Cal.

Letter from San Bernardino Co., Cal.

EDITORS PRESS:—The town of Daggett, whence I write, is situated on the south bank of the Mojave river, at a point 85 miles north from the city of San Bernardino, the county seat, with which it is connected by the California Southern railroad, the Atlantic & Pacific railroad passing through it. Daggett, which contains about 400 inhabitants, including mill hands, is the receiving and supply point for the Calico mining district, lying six miles to the north, as well as for a considerable extent of country adjacent. The Calico constitutes the most important mining district in San Bernardino county, it being from these mines that more than three-fourths of all the silver produced in California is obtained. Although not noted for its churches or literary institutions, Daggett is a prosperous town, having about recovered from the effects of the destructive fire that visited it nearly one year ago. It is a remarkably healthy place, the climate, except during the summer months, which are excessively hot, being mild and agreeable. The water is good and abundant, being supplied by the Mojave river, here quite a large and never-failing stream.

Situated in or near the town are four ore-reducing mills, two of these, the one carrying 60 and the other 15 stamps, being owned by the Oro Grande Company and run on ore from their Waterloo mine; of the other two, one is a 10 stamp and the other a 5-stamp autum mill, neither being operated with much regularity.

A local event much talked of here is the sale of what is known as the Doe property to an English syndicate for a large sum of money. From all that can be learned, this sale is dependent on the favorable report of James D. Hague, an old California mining expert, now a resident of New York, and daily expected here. This property includes the Garfield, Occidental, Mammoth, Ontario, Odessa and several claims of lesser note. On the ore from these mines, a 20-stamp mill, located at the town of Calico, has been running for a number

of years past, making a large and profitable production of bullion. It is whispered about that negotiations looking to a sale of the Oro Grande Company's property are also on foot.

Judge James Walsh, pioneer mover on the Comstock lode, is domiciled here, looking after some mines situated off to the east, that he has bonded, and, according to all accounts, on most favorable terms. The judge has about effected an arrangement with San Francisco capitalists for shipping the ore from these mines on a large scale. The enterprise promises to turn out well, the ore being of high grade, easily mined and very abundant. To what point it will be taken for sale or reduction has not yet been determined, though most likely to the Sishy Works, near San Francisco. This plan of shipping ore is growing in favor, not only here, but also in Arizona and even farther south, there being a splendid field for this new industry in Northern Sonora, where the conditions are said to be exceedingly favorable to its practice.

In looking over the last report of the California State Mineralogist, it will be observed that very little is said therein about these Calico mines, which, as being the only large silver producers in the State, it would naturally be expected would have received more attention. This omission was due to the following circumstance:

At the very beginning of last year, Mr. Ireland, State Mineralogist, appointed James H. Crossman Assistant in the field to examine and report on the mines and the mineral resources of San Bernardino county, a work that he at once entered upon. After having been so engaged for two or three months, Crossman entered the service of the Temescal Tin Mining Company, and the position he had held becoming vacant, Dr. Henry Degroot was by Mr. Ireland appointed to fill it.

Dr. Degroot, on reaching Calico, was given to understand that Crossman had worked up that district he having spent some time in the vicinity. As he had a vast extent of country to traverse the doctor pushed on, in the confident belief that his predecessor in the field would furnish the Mining Bureau with all needed information about this important locality. For reasons unexplained, however, no such information ever reached that institution; hence this awkward and unfortunate omission. It is hoped that in the next report of the State Mineralogist this oversight will be duly atoned for.

J. R. M.

Daggett, May 21st, 1891.

THE LOCOMOTIVE OF THE FUTURE.—The enormous mass of extra dead weight due to the carrying of the boiler, fuel and water in the old locomotive will be entirely unnecessary in the railways of the future, which will be propelled by electricity. Unquestionably the future electro-locomotion will show a motor on every axle, or at any rate upon two axles of each car, and every car running as a unit, in which case they can run coupled together in a train or not, as may be convenient—a strong protest against carrying this enormous dead weight of a locomotive for absolutely no purpose. We have the weight of the cars plus the passengers or freight, for purposes of traction, even if we make our cars in future of lighter material. In speaking of the lightness of the future conveyance by rail, a well-known authority says we shall not only use steel and aluminum, but paper, India rubber and other fibrous substances, which will give us remarkably light cars, far beyond anything we now speak of practically. Just as a wheelbarrow is to a bicycle, so will be our clumsy cars to the future ones. To have a big motor car loaded with tons of ballast to give it traction is following the path of steam locomotion; in all probability, the necessary adhesion will soon be gained by electricity.—*Electric Power.*

In a lecture delivered before the students of Sibley College, Mr. O. Chanute, president of the American Society of Civil Engineers, dealt with the question of aerial navigation. Reasoning from the results obtained by Captain Renard, with "La France," he concludes that with a balloon 330 feet long, with a maximum diameter of 55 feet, a speed of from 25 to 30 miles an hour might be attained. Mr. Chanute thinks, however, that the problem of flight is more likely to be solved by means of the aeroplane than with the balloon. To obtain a speed of 25 miles an hour with aeroplanes he estimates that 5.87 horse-power would be required per ton of weight. The inclination of the supporting surface should be between 1° and 2° to the horizon. The great difficulty, Mr. Chanute states, is that of obtaining a light enough motor. The weight should not exceed 50 pounds horse power, and the lightest steam engine he is acquainted with, specially built for aerial navigation, weighed 13 pounds per horse power. We may point out that Mr. Brotherhood has obtained a horse power with but little over one pound of weight in his three-cylindered engine used in Whitehead torpedoes. These engines work with compressed air.

SO FAR as known, the first death from artificially conducted electricity was that of Professor Kohnan of St. Petersburg. He devised what was practically the first lightning-rod, and was killed by it. He ran an iron to the top of his house, in present lightning-rod manner, and waited for a thunder-storm. It came. There was a terrific flash of lightning. The professor's appliance worked well, and he was found dead by the side of it.

The New Land Laws.

General Land Agent Sheehan has received an important communication from the Department of the Interior in the shape of an interpretation of the recently enacted Timber Culture Act.

Attention is first called to the section of the new law prohibiting the further entry of public lands for timber culture unless the right to make such entry had accrued or was accruing at the date of this Act, March 3, 1891.

In dealing with existing entries the right is extended to persons having the following qualifications to commute their entries in certain cases at the rate of \$1.25 an acre: The person shall have in good faith complied with the provisions of the Timber Culture laws for four years; he shall be an actual bona fide resident of the State or Territory in which said land is located.

Final proof for the commutation of timber culture entries shall be made as other final timber-culture proof is made, and shall satisfactorily exhibit the facts necessary to make purchase. Returns will be made as in commuted homestead entries under existing practice, but with proper annotations to indicate the transaction as a commutation of timber culture entry under this Act.

The new Act amends the Desert Land law of March 3, 1877, in the following particulars: At the time of filing declaration a map of the land exhibiting a plan showing the mode of contemplated irrigation, which shall be sufficient to thoroughly irrigate and reclaim the land and prepare it to raise ordinary agricultural crops, and the source of the water to be used must also be filed.

Entrymen shall expend, for purposes stated, at least \$3 an acre—\$1 an acre each year for three years—and shall file proof thereof each year, the proof to consist of the affidavits of two or more witnesses, showing that the full sum has been expended and the manner in which expended, and at the expiration of the third year a map or plan showing the character and extent of improvements. Failure to file proof during any year shall cause the land to revert to the United States, the money to be forfeited and the entry canceled.

The limit for making proof is four years from date of filing declaration. The proof must show the citizenship of the party offering it, and the cultivation of one-eighth of the land in addition to the reclamation. Final entry may be made and patent received at any time prior to expiration of four years, when all required proofs, as stated, have been made.

Entries made under the old law may be perfected under either the old or new law, at the option of the claimant.

Assignments are recognized, but the amount of land that may be thus held, prior to issue of patent, is restricted to 320 acres. Assignees must prove their assignments by filing in the local Land Office an affidavit and certified copy of the instrument under which they claim, and make affidavit of the amount of land held. The provisions of the original Act and the amendments are extended to Colorado.

The right to make desert-land entry is restricted to resident citizens of the State or Territory in which the land is located.

The new Act extends its provisions to settlers under other settlement laws, in addition to the pre-emption and homestead laws, and admits of transfers for right of way for canals or ditches for irrigation or drainage, church, cemetery or school purposes, or for the right of way of railroad.

The new Act repeals all laws allowing pre-emption of public lands by individuals, but provides for perfecting claims previously initiated, according to the laws under which they were initiated.

A person already the proprietor of more than 160 acres of land in any State or Territory cannot acquire a right under the homestead law.

Those proposing to commute their homestead entries to cash must make proof of settlement and of residence and cultivation of the land for 14 months from the date of entry.

The Ventilation of Tunnels.

Mr. Josef Purzl, assistant city engineer of Vienna, points out that the aim in every rationally designed ventilating arrangement for tunnels is to utilize natural forces for the movement of the air, and that only when these prove insufficient or cannot be made available mechanical means are resorted to. Accordingly, a knowledge of the laws of these forces alone can aid in determining the expediency of heavy or light tunnel grades, and the question of the admissible length of tunnel in which there is to be no artificial ventilation. Barometric and thermometric differences are the prime factors in the problem. To these must be added atmospheric motions or winds. Mr. Purzl, with this basis, enters into a long mathematical discussion of the laws of natural ventilation, and applies them to the St. Gotthard, the Mont Cenis and the Arlberg tunnels. Of these, only the Mont Cenis tunnel is provided with mechanical ventilation. It was expected that with the difference in level between the ends of the tunnel of 133 meters (about 436 feet), there would, under all possible conditions, be a continuous current of air through the tunnel, from north to south. This expectation, however, was not fulfilled, and provisions were therefore made for arti-

cial ventilation. While the condition of the atmosphere in the tunnel was not dangerous to passengers, it proved troublesome to the workmen. An eight-inch pipe was laid between the tracks from one end of the tunnel to the other. It was supplied with air under pressure from the Italian end, and was fitted at intervals with cocks from which the air could escape. This arrangement is presumably still in use. In the matter of grades in tunnels, Mr. Purzl directs attention to the circumstance that with a heavy grade, much smoke will be emitted during up trips, and practically none during down trips, and that the latter, therefore, are always the more agreeable ones, although the motion of a train on a down trip frequently interferes with the natural current of air, which is in an upward direction. His conclusion, in the main, is that for large tunnels, the lightest practicable grades are advisable, and that tunnels even longer than any now existing could be operated by having light grades and natural ventilation.

The Tower at the World's Fair.

Passing the Woman's building, the visitor can turn toward the northeast and inspect the foreign and State buildings in the northern portion of the park, of which he is supposed to have caught a general view from the steamboat deck, or he can turn sharply to the west into Midway Plaisance and ascend the Proctor tower. This will be constructed of steel and be 1050 feet high, or about 100 feet higher than the Eiffel. From its top the view obtainable of the Exposition grounds and buildings and of the great city lying to the northward will be magnificent beyond all description.

West of the tower, along the Plaisance and overflowing into Washington Park, will be a large and curious aggregation of structures, including probably some of the foreign and State buildings, and many of semi-private construction and of a nature that cannot yet be described. Almost innumerable structures and exhibits, such as reproductions of famous buildings, etc., most of them novel and striking in character, have been proposed, and it is not yet possible to tell how many or which of them will be erected. That there will be an astonishing array of them there can be no doubt, and unquestionably some of them will be important and exceedingly interesting features of the great fair.

All of the important buildings will stand on terraces four feet above the general park level, thus greatly improving the general landscape effect and rendering their own appearance more imposing. From scores of domes and towers and minarets, flags and streamers will be floating, and both the exterior and interior of the building will be "warm" with a liberal display of color. The beautiful park, with its magnificent array of architecture, will surely present one of the finest spectacles the eye of man ever beheld.

Early Railroad.

When railroads were first introduced, then engineers, as we call them—or the engine drivers, as they are called in England—ran their trains almost as they liked, making up time when they had fallen behind, plying up such information as they could as to the state of the track ahead of them, and, for the most part, plunging ahead with their machines without much more than a surmise whether they should bring up at their destination, or at the bottom of some high embankment.

Some of the results of this want of system would have been amusing, if they had not been disastrous. Mr. Laurence Oliphant, an English traveler and author, tells in one of his books a rather grim story of a trip which he made by rail, in 1855, from Chicago to New York. Over a part of the distance the train made the extraordinary speed, for that time, of 50 miles an hour, and presently it ran off the track.

Fortunately, the cars were latched in a soft clay ditch, and no one was seriously hurt; and in the midst of the commotion, Mr. Oliphant says he heard the engineer thus admonish the switchman, whose carelessness had caused the accident:

"Now, Tom, this is the third time you've forgot to set that switch, and the last time there were 20 people went under and the rest were bruised. So mind what you're about, and don't forget that switch again, for if you do I'll tell the boss!"

A RAILROAD ON TREE TOPS.—It may not be known outside of the neighborhood in which it is situated, but it is nevertheless a fact that in Sonoma county, Cal., there exists an original and successful piece of railroad engineering and building that is not to be found in the books. In the upper part of the county named, near the coast, may be seen an actual railroad bed on tree tops. Between the Clipper Mill and Stuart Point, where the road crosses a deep ravine, the trees are sawed off on a level with the surrounding hills, and the timbers and ties laid on the stumps. In the center of the ravine mentioned, two huge redwood trees, side by side, form a substantial support. These giants have been lopped off 75 feet above the bed of the creek. This natural tree bridge is considered one of the wonders of the Golden State, and for safety and security far exceeds a bridge framed in the most scientific manner.

Human Capacity.

Is the human race endowed with talents, tastes and capacities so as to furnish to-day the requisite number to conduct the varied affairs of life and business, so that every department could be properly filled, and all be occupied?

In reply to this question, we may say that human nature is susceptible of varied culture, and that all the faculties exist in all men (except idiots), but the faculties are naturally developed by the incidents and circumstances which may act upon given tribes or classes of people; and if the question were asked, "Are all men now qualified to adapt themselves to the different economies of life?" we would say "NO." A great majority of mankind to-day is adapted to the commonest drudgeries only, because the majority of the race has not been cultivated so much in the faculties of philosophy, and

colonies on the false basis of hunting for precious metals, and their colonial civilization is faulty. The English have colonized for homes, farms, mechanism and trade, and their footsteps have been firm, and the results permanent and powerful. France cultivates ornaments and aesthetics, and we have a nation of fancy, style and decoration. The Scandinavians, by necessity, followed the sea, and they became navigators and the explorers of the world.

If we could find a country with the soil and climate adapted to the development of every useful trade, art, or occupation, doubtless the public would become classified so as to adapt a proper number of persons to each department of effort and achievement pertaining to all the phases of an excellent civilization. New England could not raise wheat, and Illinois lacks the water-power to be, like New England, a manufacturing region. The faculties become cultivated by practice, and practice is invited by

The Buffalo Pitts Traction Engine.

The season of special activity in traction engines is at hand. It seems likely from the many uses to which engines of this sort can be put in California that they will become an all-year resort for the large-scale California farmer, but at present their chief sphere is found in harvesting our great grain crops. The engraving on this page shows the Buffalo Pitts Traction straw-burning engine, as especially built for the California trade, conducted by Baker & Hamilton of this city and Sacramento. The engraving gives an excellent idea of the design of the machine, three-quarter view, as the photographer would say.

The Buffalo Pitts Traction engine has been in use for some time in California for pulling combined harvesters, plowing, etc., and the manufacturers in their circular make the fol-

It is near the junction of the St. Clair river with Lake Huron, and connects the towns of Port Sarnia, Ont., and Port Huron, Michigan. The railroad which runs through the tunnel is the connection of the Grand Trunk railway of Canada with its line in Michigan. The tunnel is 6000 feet long and the approaches are 1950 and 2500 feet respectively, making a total length of over two miles. The approaches have a grade of 105 feet to the mile, and a heavy locomotive is required to haul trains through the tunnel and up the grade of the approaches.

The locomotives are known as tank locomotives having no tender. There is a tank on each side of the boiler, and their capacity is 2000 gallons. There are five pairs of driving wheels 50 inches in diameter. The wheel base is 18 feet 3 inches. The cylinders are 22 inches in diameter, having a stroke of 28 inches. The boiler is of steel $\frac{3}{4}$ of an inch thick, and is six feet two inches in diameter. There are 180 fires



BUFFALO PITTS TRACTION ENGINE.

ethics, and aesthetics, and mechanics, as it ought to have been; hence some nations are behind in arts, sciences and literature.

On the seacoasts we find men developed in reference to following the water, and seaman-ship is chiefly the result, and men have become almost amphibious. In other sections we find that the mechanical elements have been cultivated until the strength of the character finds its outlet in mechanism. We know of a town in Massachusetts where they nearly all tend toward the ministry and missionary work. Somebody has succeeded in that direction, and others have followed, until the strong current in that town is toward the ministry, as in other towns in the same State the current is toward navigation, especially the fisheries, and in others toward mechanism. In Kentucky there is a public sentiment that runs toward fine horses, and fine horses are the result. In other sections, not denying Kentucky her share, law, politics, statesmanship, public affairs seem to be the aspiration of the people, and in California and Colorado mining is the drift, and millionaires are the prayer, if not the song, of the people. The Spaniards have made most of their

necessity, and necessity is met or not met by opportunity, hence culture in diverse directions depends largely upon the wants of the people and the opportunities for such development. A hundred years from now this country may illustrate a harmonious division of talent and its adaptation to the different pursuits and attainments of life.—*Phrenological Journal*.

MECHANICAL IMPROVEMENTS.—A writer in an exchange says that the past two years have developed more improvements in mechanical devices than any 20 years preceding. During that time almost every branch of business has been more or less revolutionized by new mechanical appliances or new processes. It is a remarkable fact that it is more applicable to the American people than to any other nation that whenever any new device is brought out or any new process introduced, even before its utility is fairly demonstrated, in many cases hundreds and thousands are found ready to adopt it.

It will not do to run a cast iron fly wheel faster than 80 feet per second.

lowing claims for it: 1st, that it will pull any horse combined harvester built; 2d, that it will pull twelve 12 inch plows or more, according to condition of soil; 3d, that straw, wood or coal can be used for fuel, and full steam maintained with either kind of fuel; 4th, by reason of its large horse power and comparatively light weight is a perfect engine for road hauling.

The Largest Locomotive Ever Built.

A huge locomotive, the largest ever built in America and probably the heaviest ever built in the world, is now at the Baldwin Locomotive works in Philadelphia, and will be shipped next week to the St. Clair Tunnel company.

Four locomotives of the same kind have been built at the Baldwin Works for the company. Each is guaranteed to haul a load of 760 gross tons of cars and loading up a grade of 105 feet to the mile—equivalent to a train of 25 or 30 loaded freight cars. The St. Clair Tunnel company, for which the locomotives have been built, controls the line of railroad running through the tunnel under the St. Clair river.

24 inches in diameter and 13 feet 6 inches long. The fire-box is 11 feet long and 34 feet wide. The locomotive is too heavy for some of the bridges it will have to cross on the way, and the oaks, tanks, side rods, and other parts will have to be taken off and shipped separately.

A GREAT ENGINEERING FEAT.—The greatest engineering feat in the history of the anthracite coal mining is about to begin. It is the commencement of what will be known as the Jeddo tunnel, which will be driven for the purpose of draining the flooded mines of Jeddo and Harleigh. It will be constructed from Butler valley, Pa., to the bottom of Eberly's mammoth vein, a distance of three miles through solid rock, to be eight feet square in the clear. The scheme of tunneling through the mountain first occurred to John Markle, who is to be president of the company, which will bear the title of Jeddo Tunnel Co., Limited. It will open an inexhaustible supply of coal and furnish employment for thousands of people for many years to come. It will also serve the double purpose of draining all the coalfields in the valley.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SOUTH EUREKA.—*Ledger*, May 30: Work was commenced on this property last week. A shaft is being sunk at a point selected by the superintendent, J. F. Parks, as the most available site. After reaching a few feet, small bunches of quartz were encountered, although of no special significance, beyond the mere fact that gold quartz exists there, considerably elated some of those interested in the movement. A very general opinion prevails that there is a mine within the dimensions of this claim. The surface is not disturbed, as in many other locations. The claim forms an elevated plateau, with the surface comparatively level. This naturally leads to the impression that underneath, the formation will be found as unbroken as on top; so that if a quartz ledge is discovered, it will in all probability be a strong and continuous one. The machinery from the Ilex mine at Rich Gulch, Calaveras county, will be brought over and erected on the property as soon as the workmen are ready to put it in place. This machinery is first class in every respect, and cost originally over \$15,000, we are informed. The South Eureka purchased it for \$1700, from what we can learn. It is as good as new. Reports reach us that J. Griesbach has struck a rich vein of quartz in his claim in Pioneer district. The ore is estimated to go from \$30 to \$40 a ton. At the Clinton Con, it is the intention to put up hoisting machinery and go to sinking in the near future. So far the rock has been taken from a tunnel and above the tunnel level. While there is a large body of ore to operate upon above the tunnel, still at the depth of 200 feet from the surface it is only a question of time when it will be exhausted. It is therefore wise, while the property is on a good financial basis, to develop other ore bodies below the tunnel. There is talk of putting up hoisting machinery on the McAtto mine also.

Butte.

QUARTZ.—*Oroville Mercury*, May 28: Major Reynolds of the American Eagle Quartz mine, situated near Merrimac, is in town en route to the mine. His company has done a great deal more work there than our people realize. They have gone in about 3000 feet on the ledge at a 300-foot level and will crush an average of 25 tons a day during the coming season. This company has expended in the neighborhood of \$40,000 in the development of the American Eagle, and Major Reynolds is now delighted with his prospects of getting back the principal with a large interest. He thinks that the prospect for Butte county quartz development is brighter than ever before.

MORE RICH ROCK.—Frank and Tom Salsbury and Steve Henderson have struck it rich again in a quartz ledge near Inskip. They found a remarkably rich ledge a few weeks ago and, with a hand mortar, two of them took out \$760 in 16 days, and had to carry the rock several hundred yards to wash it after it was pulverized. This latter find is the third ledge located by these young men in that neighborhood and they stand a good chance of becoming bonanza kings. They don't know the extent of their ledges, but the rock is astonishingly rich in free gold.

Calaveras.

NOTES.—*Calaveras Prospect*, May 30: The Lloyd mine on the Jackson lead has several men employed in sinking a shaft and getting ready for more thorough work. The Augustini and Spinola mine on Central hill will, we hear, start up in a few days. Central hill seems to be the center of attraction these days, and all the mines are showing signs of activity. F. J. Haswell is all ready to commence mining operations at Barker's Flat, on the Stockton road. He has a boring machine in position to be operated by two horses. The Orchard mine is still hoisting gravel.

WEST POINT.—*Calaveras Chronicle*, May 30: The Blazing Star mine has just crushed rock that yielded over \$10 per ton. The Bardsley Brothers have just crushed about 16 tons of ore that paid well. Wickham's mill is now running on custom rock. Three loads of machinery have recently passed through town on their way to the mines.

El Dorado.

BLAIR CLAIM.—*Mt. Democrat*, May 30: Large teams have been engaged during the past two weeks in hauling material from the Baker's Divide ranch in Placer county to the Blair claim at the Nine Mile House. Work on this claim is being pushed rapidly, and when the improvements now in the course of construction are completed, more men will be put on, and the tunnel pushed at the rate of ten feet per day. That amount has already been driven several times.

Nevada.

MINING AT FRENCH CORRAL.—*Grass Valley Union*, May 29: The Milton Mining Company at French Corral, is now working gravel successfully by the elevator process. By using a strong stream of water the gravel is forced up an elevation of 32 feet and washed in sluices, and then the debris is deposited in a restraining reservoir on ground that formerly was washed out. The escaping water is then clearer than that which is carried in the bed of the Yuba. The elevator was experimented with for some time before it worked satisfactorily. The agents of the Anti-Debris Association, who make regular visits to the mine, have found no fault with this elevator process, as the washed gravel does not escape to the river.

Shasta.

MIDDLE CREEK.—*Cor. Shasta Courier*, May 30: Work on the Miller mill and concentrating works is progressing. They are putting the machinery in place, and the mill will soon be in full operation, as they have plenty of ore on hand. The Eureka Tellurium mine is shut down, and the directors of the same are awaiting for the spirits to come forward with the wherewithal to resume operations.

ATTACHED.—*Redding Free Press*, May 30: The Ottawa reduction works on the Shasta road have been attached and the plant is for sale cheap. The failure of the enterprise is due solely to the "soap" process introduced by a man unaccustomed to mining, and does not in any manner reflect discredit on our mines.

GOOD ORE.—The Conner mines near Middle

creek, recently bonded by Biegle, Bugbee and others, are producing some excellent ore. Specimens of quartz submitted to our inspection were very rich in coarse gold. Monroe Thompson, owner of the valuable Thompson mine near the Swasey place, on the Igo road, will commence operations in a few weeks. This week he shipped a quantity of ore to San Francisco to be tested.

Sierra.

YOUNG AMERICA.—*Mt. Messenger*, May 30: Word has been received from Sierra City that good ore has been discovered in the Young America quartz mine. The rock is said to be good \$15 rock. It was discovered at the point where No. 4 tunnel taps the ledge. A chute was raised at this point when first reached, but was only put up a few feet. Since A. C. Busch has been there during the past two weeks, he ordered the raise put up higher, and within a short distance the good rock was found.

FIR CAP.—P. R. Gardner was down from the Telegraph gravel mine at Fir Cap, on Sunday. They had nearly finished repairing the old tunnel, and will soon strike out into virgin ground.

PHENIX.—Five men are now at work at the Phenix mine, and there is every indication that the claim will prove a very extensive one. There is but little doubt but that a mill will be put up this summer.

POKER FLAT.—T. C. Corlett reported times livelier than for some years past, at his mining camp. The gravel in Mr. Corlett's drift claim yielded an average of \$5 a carload this season. The last day the boys worked Mr. Corlett panned out \$10 to the pan. His largest nugget weighed a little over two ounces. The fineness is 901. Patsey O'Donnell, John Frazier and Jno. W. Clark, who have been prospecting on the East Fork of Canyon Creek, about two miles northeast of Poker Flat had a clean-up of about 11 ounces. One piece was valued at about \$17.50. Mr. Rouse is building a dwelling at the Carney quartz mine, at the head of Jim Crow Canyon, in place of the one destroyed during the heavy winter of 1889-90. As soon as he can get lumber, he will repair and start the quartz mill.

Siskiyou.

CALLAHANS.—*Cor. Siskiyou Telegram*, May 30: The vicinity of Callahans is as good a district for the thorough miner as any in the county. Because we have had one or two failures in quartz mining, it is no indication that there are no good quartz ledges here. Some of these days good mines will be found here but not by the faint hearted prospector.

HENLEY.—Water is getting scarce for mining purposes, and the miners are making preparations to wash up and it is hoped that all will be well paid for their labors. Jilson & Co. are driving their main drift tunnel day and night. This tunnel will soon be on hedrock. Black Diamond Co. of Hornbrook expects to have the diamond drill here soon and commence to drill through the sand rock to get blue gravel. This is a good move to prospect our deep mines. A. Harvey has received the lumber for his big reservoir. Several men from below are here looking over our mines.

S. H. MINE.—Summerville is situated on the south fork of Salmon river, about ten miles from its source and 20 miles from its junction with the north fork, known as the Forks of Salmon. The S. H. is a hydraulic mine with four giants of different sizes; the largest has a five-inch nozzle, carries a thousand inches of water with 350 feet fall. The flumes are three feet wide by three feet deep, with a grade of six inches to twelve feet. No derrick is used here, everything goes through the flumes. The bedrock is granite and the surface is easily piped off, which saves cleaning by hand. All races and bedrock cuts are made with the pipes. Several acres of hedrock is cleaned each year.

Tuolumne.

PLATT & GILSON.—*Sonora Democrat*, May 30: Mr. A. Trittenbach, superintendent of the Platt & Gilson mine, informs us that a working force of ten men were put in the mine this week, to drift 100 feet to the 400 foot level.

DUTCH.—Twenty-six tons of rock from the Dutch mine, situated at Quartz Mt., was crushed in the App mill last week and yielded \$3712. The owners, Louis Lucas and the Fitzgerald Bros., are satisfied that they have a valuable property, as the vein increases in size as depth is attained. Mr. John Sevenoaks, who has for many years been prominent in mining business on the Pacific Coast arrived in Sonora this week. He will remain here several days inspecting the mines of the county. His special object is to examine the Badger mine with a view to purchase by himself and associates.

GOLDEN GATE.—An extension of the Golden Gate mine, situated on the east side of that mine, and owned by Chas. Richards and Dick Phillips, gives great promise of developing into a fine paying sulphure mine. Ore from the mine, which contains a large vein, gives encouraging results. The boys are laboring under a disadvantage, not having the required capital necessary for the full development of the mine, but if it could be tickled with a little coin, we opine that soon the stamps of another mill would be chiming in with those of the Golden Gate on ore of a similar character.

NEVADA

Washoe District.

ALTA.—*Virginia Enterprise*, May 30: Five stamps of the mill are crushing ore from the old reserves between the 900 and 700 levels.

OVERMAN.—Are running but one compartment of the shaft as yet, but expect to start the other as soon as repairs to the shaft are finished.

YELLOW JACKET.—Are extracting about 200 tons of gold-bearing rock daily from the 1300 and 1400 levels, and about 40 tons of gold and silver-bearing ore from the upper levels.

SCORPION.—The joint East Sierra Nevada north drift from the 900 level of the Union shaft was advanced 25 feet, making its total distance 67 feet from the shaft; the face is in porphyry and clay.

SIERRA NEVADA.—630 level: West crosscut No. 1 from the northwest drift, 571 feet from the shaft, has been advanced 31 feet; total length, 448 feet. The formation is very tough.

CHOLLAR.—The south drift, 1400 level, from the north line, is out 132 feet; face in hard porphyry. The winze in the joint east crosscut, north line, 1400 level, is down 18 feet; the bottom is in porphyry. Extracted and sent to the mill the past week 543 tons of ore, worth, as per battery samples \$24.50 a ton.

POTOM.—The winze is down 117 feet below the 1400 level; the bottom is in porphyry and streaks of quartz. The south lateral drift from the winze station, 1300 level, is out 254 feet; face in porphyry. The south lateral drift from the Chollar incline, 1100 level, is out 196 feet; face in hard porphyry.

EXCHEQUER.—The east crosscut on the north line, 600 level, is out 218 feet, face in porphyry.

ALPHA.—The south drift, 218 feet east of shaft, 300 level has been repaired 36 feet. West crosscut, 100 feet north of the shaft, 500 level, is out 659 feet; face in hard porphyry.

SILVER HILL.—The southwest drift, 50 level, is out from shaft 60 feet; face in soft porphyry. South crosscut, 160 level, is out from winze 550 feet; face in hard porphyry.

NEW YORK.—North lateral drift, 600 level, is in north of shaft 222 feet; face in porphyry. North lateral drift, 1100 level, is out north of shaft 509 feet; face in low-grade quartz.

WARD COMBINATION SHAFT.—The south drift from the 1800 station is out 40 feet.

SIERRA NEVADA, MEXICAN AND UNION SHAFT.—West drift from the shaft, 900 level, is out 264 feet, making 52 feet during the week; the face is in hard porphyry.

UTAH.—Incline winze has been sunk 31 feet; total depth, 95 feet, continuing in porphyry, clay and quartz of low assay value.

SEG. BELCHER.—On the 600 level the west crosscut from the south lateral drift is out 72 feet. It is still in soft porphyry.

CON. IMPERIAL.—We are still following up and taking out small streaks of ore on the upper levels and prospecting in and around the old stopes, where we find some fillings and bunches of ore of fair grade, which is being shipped to the Brunswick mill for reduction.

BELCHER.—The south drift from No. 2 crosscut on the 200 level is now out 310 feet. The face is in a mixture of clay and low-grade quartz. The north drift from the main west crosscut from the shaft, 300 level, is out 186 feet. The face is in porphyry and low-grade quartz. The east crosscut from the north lateral drift on the 1500 has been advanced 13 feet during the week. The face is all quartz, assaying from \$2 to \$12 per ton.

CHALLENGE CON.—The joint Confidence and Challenge west crosscut on the 600 level is out 48 feet, 10 feet having been made during the week; the face shows quartz of no value. Joint Confidence and Challenge north drift on the 1100 level is in 273 feet, 20 feet having been made during the week; the face being in porphyry.

CROWN POINT.—The east crosscut from the south end of the 350 slope on the eighth floor has been advanced 26 feet during the week and is now out 32 feet. The face is in a mixture of porphyry and clay. The east crosscut on the 1000 level has been extended 26 feet since last report, and is now out a total distance of 130 feet. The face is in vein material composed of clay and quartz.

HALE & NORCROSS.—On the 1400 level the winze from No. 3 east crosscut is down 120 feet, the bottom in porphyry. The joint winze in No. 5 east crosscut on our south boundary is down 10 feet. We have put in a small hoisting engine at the top of this winze and have the same running, which will greatly facilitate the work of sinking. On the 1500 level the north and south lateral drifts from the station are each advanced ten feet. The formation in these drifts is porphyry.

SAVAGE.—We have hoisted 586 cars of ore from the 500, 750, 800, 900 and 1000 levels. Shipped to the Mexican mill 541 tons and milled 630 tons; average battery assay, \$17.25. We have bulion on hand amounting to \$224,488.06. On the 750-foot level we are extracting rich ore. On the 950 level the winze started 180 feet north of our south boundary is down 40 feet; the bottom is in porphyry. The south upraise from this level has been carried up 59 feet; from the top of this upraise we have started an east crosscut and advanced the same 15 feet in quartz and porphyry. On the 1100 level the west crosscut opposite the east crosscut from the north drift was advanced 35 feet; total length 60 feet; we have stopped work on this drift and resumed work in the face of the north drift. The north drift, 1400 level, was advanced 7 feet, making its total distance north from the east crosscut 70 feet; we are stopping fair ore from this drift. We have started an east crosscut from the end of this drift, and advanced same 12 feet.

ANDES.—On the 420 level, east crosscut from main north drift was advanced 20 feet; face in quartz and porphyry. During the week this crosscut has been passing through quartz that yields low assays. East crosscut from south drift was extended 13 feet, face in quartz.

OCCIDENTAL.—Extracted pay ore from the 300, 400 and 450 levels. South drift from No. 1 upraise, 500 level is in 91 feet, face in low-grade ore. North drift from same point is 106 feet; face in quartz and porphyry. The upraise from south drift, 600 level is up 24 feet; top in pay ore. North drift from No. 2 winze, 650 level, is in 372 feet; face showing ore of some value. South drift from No. 1 winze, 750 level, is in 101 feet; face in low-grade ore.

Ely District.

PURCHASE DECLARED OFF.—*Pioche Record*, May 30: The people of Ely are once more keenly disappointed in the hope of a speedy revival of general business there, the proposed purchase of the Joanna mine by the syndicate of Montana mining men, reported last week, now being declared off. The immediate cause of the failure is the litigation hanging over the property, which the purchasers were assured was ended, but which on examination was found to be still alive. They expressed themselves as very well pleased with the property, but declined to assume or risk any litigation. The claim against the mine is made by Mrs. Josephine Wolcott, of San Francisco, who says she is entitled to a half interest, through furnishing Watson, the presowner, with a grub stake of \$5000 to prospect with, she to own equally with him in all properties located. Watson says Mrs. Wolcott was to share only in such copper mines as he might locate and in no others; that she is interested in all such claims. Last year Mrs. Wolcott sued for half the Joanna property and the suit was dismissed on a technical point in the district court at Ely. Mrs. Wolcott, however, is seeking to have the judgment of dismissal set aside and for a trial of the case on its merits, and until it is settled uncertainty will attach to the Joanna title. All who have examined the property during the past two years report it as possessing great merit, and its active working is regarded as

certain to develop the whole district and revive the drooping interests of that section, as other good claims lie close to it. The people of Ely are greatly disappointed at this second failure of a sale, and we understand some are leaving the place in disgust, under the belief that nothing will be done there for an indefinite time.

Hawthorns District.

LAPANTA.—*Walker Lake Bulletin*, May 29: During the week the main northeast drift above the tunnel has been extended eight feet. Same has been stopped for the present and an upraise has been started on the ore 25 feet back from the face. As indicated in the last report, 10 inches of \$100 gold ore has been encountered in the incline below the tunnel, and a drift has been started south on this ore from the point of discovery.

PANLICO.—The lessees still continue to extract good ore from the north tunnel and the stopes at the long incline, and some rich ore has been encountered in the incline below the location tunnel.

CENTRAL.—Still stopping both ways from the incline above 75-foot level, and sinking incline, which is now down 150 feet on vein.

MOUNTAIN KING.—The south drift from the tunnel has been extended 25 feet, and a crosscut run through the ledge. Same shows very strong. The main tunnel is being run ahead to cut the hanging-wall vein.

HARTFORD.—Principal work done in this claim during the week has been stripping the vein at the south end of the claim.

BEACON.—Drifts are being run each way from the incline and stopes being started on the ore.

CAPITAL.—The drift from the crosscut is being extended on the vein, showing the same character of high-grade ore in the face.

GOLD BAR.—The incline winze is down 55 feet, the vein showing very strong, and a drift has been started north from the bottom, following the vein.

DICTATOR.—Still engaged in opening the copper and silver vein on the surface.

CONFIDENCE.—The incline from the northwest from the main upper drift has been extended 15 feet, the vein going down at an angle of 25 degrees and showing very strong. Considerable second-class ore has been sacked during the week.

FAIRMOUNT.—The main south drift has been extended 14 feet during the week. The ore still holding in the face and getting stronger. A stope has been started above this drift which is producing considerable 150-ounce ore.

CHALLENGE.—A winze has been started below the tunnel showing a good-sized vein, the grade of the ore being about 60 ounces.

WAR EAGLE.—Still extracting ore from the stopes.

IDA.—A very nice body of ore has been exposed in this mine in the winze below the tunnel. A drift has been run east on the same 50 feet below the tunnel, which shows the same character of high-grade ore.

Pioche District.

THE NEW SMELTERS.—*Pioche Record*, May 30: Work at the new smelter is progressing fairly well. Stone masons are busy putting in substantial dust chambers and flue, and the work of throwing up the grade to the ore bins continues. Foundations for two ore bins are ready and 45 feet of the main building is up and covered in. When finished this building will be forty feet wide by 120 feet long. The south half of the building will not be raised until the boilers and stacks are placed which will be done as quickly as possible. A small boarding house is finished ready for occupancy and an office and scale room is in course of construction. The course of the projected tramway line from the works to west point and the Day mine is altered so as to run almost straight from the works to the point instead of running up and skirting the foot hills just west of town. This it is found will shorten the line somewhat and make the grade better.

Silver King District.

TO CONSOLIDATE.—*Pioche Record*, May 30: John F. Cupid, County Recorder of White Pine county, came in by private conveyance Monday evening and remained over Tuesday, returning Wednesday by way of Silver King district, at which place he is interested in several mining claims. A movement is now on foot to merge all the claims in that district owned by the Wheatly brothers, Cupid and others, some ten in number, and make one sale of the whole. Only one or two owners remain to be seen about the matter, and it will probably be done, when we may look for something far above the average there, as ore is plentiful, though mostly low grade.

Taylor District.

DESERTED.—*White Pine News*, May 30: We made a brief visit to Taylor Tuesday in company with J. B. Simpson, C. B. Wadleigh, Major Trece, Fred Clark and F. X. Murphy, to attend the funeral of Col. Fitton. We found the place almost deserted so far as visible signs go. Still, there are a number of people living there yet, and when the Monitor miners come out and the other residents get together the place takes on a livelier appearance than any one would think at first glance. One thing about Taylor is particularly noticeable for a nearly deserted place, and that is the good condition of the vacant buildings and sidewalks. They appear in just as good condition as when vacated nearly three years ago.

BONDED.—The Argus mines in Taylor are said to have been bonded by A. C. Cleveland, and the people of that town are in hopes that a California corporation will soon take hold of the property and resume operation thereon.

Tuscarora District.

NAVAJO.—*Times-Review*, May 29: The 350-foot level stopes are looking well. Everything running as usual.

DEL MONTE.—Joint west crosscut, 3d level, has been extended 24 feet. Joint raise from same crosscut has been connected with north drift on the 2d level.

NEVADA QUEEN.—South drift from east crosscut, 4th level of Commonwealth, advanced 15 feet; still in vein formation. Nineteen tons of ore worked at Union mill; average battery assay, \$25.79 per ton.

BELLE ISLE.—West crosscut from the south drift, 350-foot level, extended 12 feet in favorable formation. The men have been put to drifting north and south on the ore cut last week, progress 15 feet. The

south drift shows over two feet of ore, most of it being very high grade.

COMMONWEALTH.—North drift from east crosscut has been extended 10 feet on the vein. Raise started and up to feet, showing a streak of fair-grade ore; picked sample assayed \$262 per ton. South drift extended 15 feet. Forty-three tons of ore worked at the Union mill, battery assay, \$216.42. Forty tons of ore sent to the concentrating plant.

NORTH COMMONWEALTH.—First level: Stopes continue about the same. Seventy-six tons first-class ore worked at Union mill, battery pulp assay, \$198 per ton. Shipped bullion valued at \$30,266; crude bullion on hand about \$15,000. Will ship again Monday.

NORTH BELLE ISLE.—North drift from Belle Isle 450-foot level extended 22 feet. No. 1 winze, same level, extended 11 feet, showing some good ore; water very strong. South drift from No. 1 east crosscut, 400-foot level, extended 16 feet. North drift, same place, extended 9 feet, face showing some good ore. The stopes above these drifts are improving. No. 2 east crosscut, same level, extended 30 feet. South drift, 500-foot level, extended 8 feet. The stopes from No. 4 chute, 600-foot level, are yielding some very rich ore. Broke 7 cars of first-class and 51 cars of second-class ore. The Union mill has crushed about 50 tons of ore, assay value \$250.

White Pine District.

PROSPECTING.—White Pine News, May 30: Parties in from Hamilton tell us that Supt. Read intends to work 25 or 30 men this summer prospecting in the Eberhardt tunnel. It is also said that the indications for getting rich ore are very good.

ARIZONA.

DIAMOND JOE.—Mohave Miner, May 30: Nearly two car loads of beautiful copper-silver glance ore from the Diamond Joe mine, near Cedar, was worked at the sampler last Tuesday. The ore is rich in silver, copper and lead, and returned considerable money to the owners. The mine never looked better than at present and the prediction is made that it will be one of the steadiest producers in the county, as the mine is opened up in a shape to work. Quite a number of men stopping out ore and still continue prospecting for more, a thing that is seldom done in Mohave county.

SCHUYLKILL.—Cross Bros. are preparing to commence work on the Schuykill mine at Chloride. The Schuykill is one of Chloride's oldest locations and a smelter was erected on the ground years ago, but owing to imperfect knowledge in the art of smelting the smelter was not considered a success. Thousands of tons of rich lead ore have been shipped to the various smelters in New Mexico, Colorado and Southern Arizona. The cost of hauling and shipping cut an immense hole in the value of the ore, but at the same time it paid much more than the shipping expenses.

TIN AND ZINC.—Tombstone Prospector, May 26: The discovery of a great vein of almost pure zinc near the river and only 30 miles above Yuma is of great importance. A vein 60 feet in width and a half a mile in length with ore that runs from 75 to 90 per cent of zinc is not met with every day. Another very important discovery lately made on the borders of Yuma Co., is that of two veins of tin, each of which is about three feet in width. The assays made, show the ore to be of a high grade. Competent judges and experts believe that this is one of the most important discoveries ever made in western Arizona.

NOTES.—Prescott Courier, May 29: J. B. Kelly's team is constantly engaged bringing in ore from the Wren and Blue Dick mines, Hassayampa district. Catocin, at a depth of 111 feet, is eight feet wide and very rich. Ore is shipped from the Prescott ore works. J. O. Floyd, of Turkey Creek district, is taking out good ore. So are Reed & Watson. F. Scopel works ore from the Gen. Crook ledge in an arrastra, pays his way and has a snug bank account. Lots of ore from the Belle and another Big Bug district mine are at the sampler. Three furnaces are running at United Verde. Fifteen large teams hauling coke, bullion, etc. This is the camp to which a railroad is being constructed. Blue Dick is sending in good ore. Capitalists have made an offer for the mine. John S. Jones has started work on his dam in Big Bug district. The dam will be 110 feet at top; 20 feet deep; 'twill give him water to run his mill, etc. Following facts concerning the Yuma copper mines are learned from C. W. Culver, who came from there a couple of days ago: They are owned by rich men of St. Louis; consist of 32 claims; opened by shaft, 450 feet; another, 350 feet; 4000 feet of tunnels and drifts; 50,000 tons of ore in sight; carries gold and silver in moderate quantities. There are two bored wells; the deepest is 800 feet; both contain considerable good water. More water is being piped from a spring in a mountain. A 50-ton smelter will be started running about the first of next month. Two more smelters, of same capacity will soon be set up. Tramway from mine to smelters is being made. The camp is 75 miles from Prescott; 95 from Phoenix. The company will give \$150,000 or \$200,000 to any company that will construct a railroad on the Date creek route.

BRITISH COLUMBIA.

TRAIL CREEK DISTRICT.—Nelson Miner, May 29: A district may have good indications for mines, but unless the advantages of the district are brought to the attention of prospectors and investors but little headway will be made. That Trail Creek district has good indications of mineral is not now disputed, and no man can well dispute that to E. S. Topping is due much of the credit for getting mining men interested in the district. Mr. Topping has been untiring in his efforts, and he has been rewarded by selling the Le Roi to a Spokane company for \$25,000, not in Spokane real estate but in good money and bankable paper. He arrived at Nelson this morning and reports the camp as quiet, but that by the middle of June operations will have made a start. The company that purchased the Le Roi also bonded the Center Star, the Idaho, the Harvey, the Pride of Trail Creek, and the Chief of the Mountains, and expects to have a force at work on them by the 15th of June. They got a return of \$72 in gold and 14 per cent copper from an average sample taken from the Le Roi, and are well satisfied with their investments. The ore in the claims on the south side of Trail creek has changed in charac-

ter and is now almost entirely galena. Of these claims Hoover's Lilly May is probably the best known. From a picked specimen of it an assay of \$500 in silver was obtained, an average sample assaying \$167. The surface ore of nearly all these claims carried gold and copper; but now little gold is obtained and the copper is replaced by galena. John H. Reed sold the Blossom to Mr. Topping a few weeks ago. Since purchasing it Mr. Topping has run a tunnel in on the ledge 32 feet. The face of the tunnel shows four feet of ore, from which assays of \$47 in silver and \$7 in gold have been obtained. Several new locations have been made this spring. Jack Buchanan making one which promises well. From 60 to 75 men are in the camp.

CHANGED OWNERS.—The Boulder hydraulic claim on 49 creek has changed ownership, H. F. Keefe, D. McGillivray, R. G. Tallow, and R. C. Ferguson purchasing it from A. L. Davenport, M. C. Monaghan, the Barker Brothers, N. Riopell and J. P. Lamotte. The consideration is said to be \$2000. The claim is believed to be a good one, and if worked systematically will no doubt yield good returns on the investment. The ditches are being cleaned out, and operations will be commenced in earnest next week. Vancouver men are thus bound to get in and make a killing in the lake country.

ANOTHER GOOD FIND MADE IN GOAT RIVER DISTRICT.—That "Jap" King's Alice is not the only prospective mine in Goat River district is evidenced by the samples of ore exhibited by C. C. Sproule and George Long from a claim of recent discovery. From three assays made, returns of over \$100 to the ton in silver were obtained. Besides silver the ore carries large percentages of lead and some copper.

ABOUT 100 MEN ARRIVING WEEKLY.—About 100 men a week are arriving in the lake country. A large percentage of these men are miners and prospectors, and hail from every state and territory in which mines are worked. One camp over on Rover creek, near the late galena discoveries, is made up principally of arrivals from Idaho, thirteen of the number being Cœur d'Alenars.

COLORADO.

SILVER AGE.—Idaho Springs Gazette, May 30: They have struck a four-foot streak of ore in the 6th level of the Silver Age. The rains lately have made the road impassable and they have been unable to mill any ore for two weeks. There are 100 tons already sorted up at the mine and 120 tons broke in the mine and not hoisted out. The placer mine which is being worked at the mill looks as though it would prove a bonanza. Two men are taking out 1/2 oz. per shift now and bedrock sloping off toward the mountain, which proves that they have not yet struck the deep channel. With expenses on high bedrock, the deep channel ought to pay largely.

DAKOTA.

GALENA.—Deadwood Pioneer, May 27: There are a number of properties in this camp that are now being worked, and many others that are only awaiting the advent of a railroad, when operations will be commenced at once. This is pre-eminently a low-grade camp, ten tons of ore not averaging over \$30 where one ton goes \$80 or \$100. Consequently it will not pay to haul long distances, ship to smelters and give up an exorbitant price for reducing.

AN IMPORTANT FIND.—A new find of 'free milling ore has been opened up within the city limits that will create a sensation. Experts will report, and a free milling plant will be the next great sensation.

SCOTIA.—Supt. Cassels, of the Scotia, is somewhat jubilant over the recent strike in that property, and thinks that it will prove to be a find of magnitude. Five stamps of the Monitor mill are now running on the ore, which goes \$6 per ton.

MONITOR.—Indications at the Monitor mine are favorable for a resumption of dividends at no distant date. The quality of the ore is steadily improving and as the roads are in good condition, the expense of hauling the ore from the mine to the mill is greatly lessened.

IDAHO.

ATLANTA.—Cor. Idaho Statesman, May 30: Atlanta is patiently awaiting the revival of interest in this long-neglected camp, which it is confidently expected will occur during the coming summer. The wished-for transfer of the Atlanta Hill property seems now to be an assured fact and the transfer papers are all on record. It is expected that Mr. Miller will add more stamps to the Taboma mill and work the mine more extensively than it has heretofore been. Mr. Oglesby has lately arrived from Boston, Mass., and is preparing to start up the Big Lode mining property. Mr. Oglesby intends running a tunnel to tap the ledge. Said tunnel will be about 400 feet in length and three shifts will be worked. The company already has a fine mill just below where the drift will be, and as soon as the ledge is reached will be able to go at once to extracting and crushing. The Buffalo mill is at present running on ore from the Buafflo mine and still has about a month's run ahead. The property was taken on a lease last fall, when the company shut the mine down, by a party of miners consisting of a dozen or more, and they have been working it ever since. They have out 400 or 500 tons of rock, which, according to the battery samples is good. No. 1 rock, and each of the leasers will clean up quite a little pile. Mr. Geo. Tims has had quite a number of men working for him all winter and is only awaiting the starting up of the Taboma mill to have his rock crushed, of which he has quite a large amount. Messrs. Irwin and Shultz also have out quite a run of first-class ore which they are waiting to get crushed. Water having been very scarce here this season not much has been done in the way of placer mining. Mr. R. B. Brown has been taking out ore on the Atlantic hill as has also Messrs. Wm. and Lee Abbott and Louie Frankey on a bar below the town. Mr. Prey and son were mining on their claim as long as the water lasted and did very well. At the Bar everything is working along smoothly and all of the different properties are slowly increasing their working force. The old reliable Elmore never looked better, and the same may be said of the Vishnu. They are both working a full force of men, and the stamps are kept working day and night. The Ophir has lately started up under the

general management of Mr. Boyd, with Frank Lester as foreman, and is looking fine. The Wide West at Red Warrior is increasing in size and richness every day. Besides these there are a number of minor properties working, all of which are looking extremely well. Adam Gottsch has a five-foot vein of No. 1 milling ore on his Richmond claim which gets better and richer as he advances on the ledge. Jake Ruter has several men employed on a fine prospect above the town on Bear creek, and the Queen of the Hills, owned by Pierson, Adams and Ahernson, never looked half so well as it does at the present time, and as it has always been one of the finest prospects in the camp that, I think, is saying a good deal. From the necessarily imperfect and incomplete account of the above-mentioned properties it will readily be seen that everything points to the continued and rapidly increasing prosperity of Atlanta, the Bar, and indeed this whole section of country adjacent to the two camps.

MONTANA.

IN THE TOWNSEND DISTRICT.—Townsend Messenger, May 28: The Silver Star mine has an incline shaft 124 feet deep, from which has been taken numerous carloads of ore. There is now between three and four carloads of first-class ore at the mine ready to be and which will be shipped to Omaha in a few days. The lode is four feet wide and the average assay is \$50. The work of running levels from the bottom of the shaft will be prosecuted with three shifts, and it is expected that the mine will be in shape to produce several carloads a week by the 1st of July. The company, which is a close corporation, has abundant capital, and the management is in the hands of good business men who are determined to thoroughly develop and work systematically. It has been surveyed and the proper application for a patent initiated.

THE DAKOTA MINE.—Neihart Herald, May 28: The Dakota mine is generally regarded by expert mining men as one of the finest properties in the State, and indeed it may be said that there are few other mines in the Rocky mountains that have the showing of ore for the amount of development done. It is estimated by conservative figures that there are 300,000 tons of ore exposed in the workings, which consist of three tunnels and a shaft, all of which will not amount to more than 1500 feet of development. The Lady Shalotte is the extension of this enormous vein and is one of the properties of the St. James Con. Mining Co. The intention is to let a contract to sink on this lead in the next few days, and as the shaft is now at a depth of 16 feet, in six feet of ore and the footwall has not been found, it is fair to presume that some grand results will obtain from further development of this property.

BOSTON AND MONTANA'S NEW WORKS.—Great Falls Industrial, May 28: J. W. Cornelius, the gentleman who has all the contracts for putting up the buildings at the Boston & Montana Works, says that he has now over 300 men at work and that the buildings will be pushed to completion just as fast as men are able to do it. In his opinion the works will be finished this year and be in running order by January 1, 1892. The fact of the railroads forging ahead to the Barker and Neihart district makes it imperative on the part of the management to push work as rapidly as possible in order to be ready for the great influx of ore that will come in when the railroads once tap these districts. At a low estimate the Boston & Montana Works will employ 1000 men.

NEW MEXICO.

RICH ORE.—Pinos Altos, May 29: The Dimmick Brothers are taking out three classes of ore. The first class runs \$18,000 to the ton; second \$10,000 and third \$5,474. If there is anything in this country that can beat their's in the way of a mine it is not yet known. And that little property is one of the many rich claims in the Pinos Altos district. The Climax, the south extension of the Silver Cell, is down 50 feet between well defined walls. At the bottom of the shaft the lead is more compact and valuable than any time since discovery. At 100 feet a drift will be run north to connect with the Silver Cell, when unless all signs fail, the two will meet in a silver ball that will put the bridal chamber "to bluse." The Silver Cell is now down 65 feet, all in metal. At the bottom of the shaft the lead is more compact and valuable than ever, demonstrating beyond a doubt that it is not, as many supposed, simply a pocket. The owners do not propose to drift until down 100 feet. They have taken out about \$10,000 while sinking, and should they desire, could take out ten times that amount by stopping from the shaft alone. The Alice mine, owned by Jim Woods, is being worked by Fritter and Brakehill. These gentlemen are taking out ore that may be classed simply as lead. At this writing there appears to be no limit to the metal, and unless all signs fail the lesses have a bonanza.

UTAH.

PARK NOTES.—Park Record, May 30: Owing to the late spring and the slow manner in which the snow is leaving, many claims are still idle, which will be actively developed during the coming summer. The snow is still deep enough in places to retard operations, and many miners are working under the disadvantage of short supplies, both as regards necessities of life and mining supplies, as but little hauling can be done. The greatest drawback at the present time, however, is trouble from surface water, which is bandicapping almost every property visited.

WASHINGTON.

TOUGHNUT AND HOMESTAKE.—Okanogan Outlook, May 28: The statement of Col. Wallace, in the Spokane Review, that John W. Mackey and others, of Comstock notoriety, have bonded the Toughnut and Homestake mines in this district and will commence mining operations here on a large scale, naturally excites a great deal of enthusiasm, and speculation is rife as to what mode of operations they will pursue.

BLACK BEAR AND WAR EAGLE.—The War Eagle and Black bear mill site presents a scene of bustling activity. A force of from 15 to 20 men are pushing work on the water ditch which will be completed in a few days. A short flume will then have to be built to carry the water from the ditch to the

mill. Lockwood's sawmill is busy cutting lumber for the mill and a corps of surveyors are laying off the site.

HIDDEN TREASURE.—Wm. O'Neill has sold a half interest in the Hidden Treasure claim to F. W. Wittenbrock & Co., of Spokane, for \$3000.

WORKING IN THE COAL.—Wm. Stillwell, Geo. Stillwell and Geo. Heller started this morning with four pack horses loaded with provisions for the Melbow. They expect to do considerable development work on their coal properties this season.

THE LONE STAR.—The Lone Star shaft is rapidly approaching the 400-foot level, and its progress is being watched with a great deal of interest by all who are identified with the development of mines in this district. Allen C. Mason and Henry Lawrence for five years have been pushing development work almost without intermission, and now have about 1800 feet of tunnels, drifts and shafts. A depth of 350 feet has been reached in the main shaft, and the result shows that the ledge has been gradually increasing in size and the amount and quality of ore has continued to improve with every foot of depth gained below the surface. What was originally a 16-inch vein of comparatively low-grade ore, at a depth of 345 feet (before the present work was begun) had developed into a six-foot ledge of almost solid ore. The grade of the ore has also improved in nearly the same proportion.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

WEEK ENDING MAY 26, 1891.

452,903.—DOOR-SECURER—N. Cosman, Fremont, Wash.
452,946.—GAS GOVERNOR—F. Ellis, S. F.
453,042.—FRUIT PITTER—W. C. Evans, Oakland, Cal.
453,045.—HINGE SINKER—W. H. Gutzman, Berkeley, Cal.
453,117.—CAR AXLE BOX—D. B. James, S. F.
452,947.—DOOR-SECURER—W. B. Morris, Seattle, Wash.
452,948.—STRAW SEPARATOR FOR THRASHERS—E. H. Nicholson, Santa Maria, Cal.
452,942.—AIR BRAKE SYSTEM—Wm. W. Slater, Oakland, Cal.
453,165.—FAUCET—C. P. Smith, San Diego, Cal.
453,095.—TRAMWAY—J. T. Vinion, Spokane Falls, Wash.
452,818.—SANITARY PLUMBING—F. A. Weinshank, Los Angeles, Cal.

The following brief list by telegram, for June 2 will appear more complete on receipt of mail devices:

California—San Francisco, James B. Stetson, J. Hammond, W. L. Holman, J. W. Harris, cable gripping mechanism; John T. Smith, W. Copeland, tanning connection; John A. Larsooth, mechanical ledger; Emery L. Nichols, governor and valve movement for gas engines; San Diego, Elmore Stewart, car coupling; Santa Cruz, Hiram M. Hamore, non-heat-conducting composition; Fresno, James Porteous, raisin and fig press.
Oregon—Salem, Michael J. McKinnon, tire tightener; Taylor, Geo. W. Rowley, cable clamping device.
Washington—Seattle, John M. Frink, J. Readman, logging truck; Colfax, Legrand D. Harding, shoe for deformed feet; Lacouner, Peter E. Frostad, rudder for boats.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co. in the shortest time possible (by mail for telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

AIR-BRAKE SYSTEM.—Wm. W. Slater, Oakland. No. 452,942. Dated May 26, 1891. This invention relates to an improved signal for use on railway trains and means for operating the air-brakes thereby. It consists of an electric conductor extending through the train of cars, means for coupling the ends of the conductors at points where cars are coupled together, a means for completing the circuit from any point in the train, and the mechanism whereby the completed circuit is caused to act upon an electro-magnet and through it to open air-valves, so that the engineer from his station may at any time test the connections and be sure that the electrical circuit and the air-pipes have been properly coupled in making up the train, and also to operate the air-brakes, while from the rear or any other portion of the train the engineer may be signaled at any time by completing the circuit. The usual method for making connection between the front and rear end of the train is by means of a cord extending through the train from end to end. In practice it is found difficult and almost impossible to operate this cord through a long train when it is often broken in the attempt to use it. By Mr. Slater's device electrical conducting-wires are used instead of a bell-cord and they are so arranged that a complete circuit is made between any number of cars. Stops may also be made by means of the rear valve mechanism so that the rear brakes are set first and act as a drag from behind. This avoids the irregular end motion of the train which results from the opening and closing of the engineers valve when that is used and which unavoidably causes a jerky motion when coming to a stop.

DOOR SECURER.—Wm. B. Morris, Seattle, Washington. No. 452,947. Dated May 26, 1891. This is a novel device for fastening doors and which may be used separately or in addition to and in conjunction with the ordinary locks and fastenings. The construction is such that a traveler may carry the device conveniently in his pocket so that he may apply it to the door of any room which he may be occupying. When applied to the door it will be impossible to force the door open without tearing the fastening out of the casing or in some other way breaking or destroying it.

The mine-owners at Mullan, Idaho, have organized in opposition to the Miners' Union.

SCIENTIFIC PROGRESS.

Prof. Swing on Immortality.

To believe well in a future beyond, it seems essential that we should make the assumption of spirit as a starting point, and then the whole material world becomes the servant of the spirit; but if, with Huxley and Darwin, we begin with the assumption of matter, there seems nothing to throw us across the dividing ocean, and we must remain on the shore of dust, and hence death; for, move to and fro as material does, from wild rose to full-leaved rose, from ape to man, it always brings us at last only the dust. There is no immortal rose, however full-leaved it may become. Death is its destiny. To get over this tomb of roses and of man, it is essential that a spirit be assumed; a God, an essence differing from the vital action of the heart or of the roots of the wild flowers. In this study of man, alter we assume that he possesses a spirit, the text enters with its single thought that God is not a God of dead souls, but of living ones. There is no manifest reason for supposing a soul made in such a divine image to be only an ephemeral creature, going quickly to nothingness, thus making God the Father of the dead rather than of the living. All the reasons for creating such a being as man remain for continuing his existence. If, when the Creator had formed such a universe as lies around us here, of which our system is as a grain of sand upon an infinite shore, He finally concluded to make man a race to inhabit one or more stars of the universe, a race in the divine image, a human life of a few years would seem wholly unworthy of such a boundless material realm; for we cannot master its truths nor taste happiness in any three-score years' career. Your children have shown their divine nature, have spoken a few words, have rejoiced in a few springtimes, and have gone hence, leaving you heartbroken. A brief career is thus not in harmony with the immense universe in which this life begins, and of which man is unquestionably the highest order of beings.—*American Spectator*.

A more philosophical theory to our thinking would be the assumption that both spirit and matter are eternal and co-existent—as positive and negative, intelligent and inert. That spirit which we call God, through its intelligence, moved upon matter, and matter thus became the "servant of spirit." With such an assumption there is no "dividing ocean" to cross; moreover, it is as easy and quite as philosophical to assume the two existences as the one. All subsequent events might follow from laws ordained by spirit, or by evolution, as you please. Matter may move to and fro "from wild rose to full-leaved rose, from ape to man," but all must return again to dust. The rose from the wild to the full-leaved would fulfill its mission. There would be "no immortal rose, however full-leaved it may become." But alter the rose the animal, and in the fullness of time man, as the limit of evolution (creation if you please). Into man, as the crowning work of evolution or creation, spirit infused its divine or never-dying life, "and man became a living soul"—immortal in his soul existence. Its earthly covering, like the full-leaved rose, must return to dust from whence it came, but the spirit "returns to God who gave it" to continue its spirit existence through all eternity.

Matter may change its form from gas to rock, to tree, to rose, to animal, but it never disappears—it is as eternal as the spirit which acts upon it. There is a vegetable life and there is an animal life, but there is no essential difference between the vital action of the heart and the movement which sends the life-giving fluid of the vegetable from its roots to its branches.

The spirit in man, which we call soul, is a part of the original spirit which first acted upon matter in the beginning—if we may assume a beginning. That original spirit we call God. It exists everywhere throughout the universe.

The essential thing in man is his soul—his spirit life—a life which is not in the brute. The brute may think; may be affected by fear, by love, by anger; but the brute has no aspirations for the future. His thoughts do not pass beyond the present. Therein lies the great difference between man and the brute. Since it has been given to man to look for and to aspire to a life beyond the grave, there is no manifest reason why the source of that aspiration—the soul, which distinguishes him from the mere animal—should not attain its desires. Everything in reason and our aspirations points to the supposed fact that God has endowed man with a never-dying principle, which, when it throws off this earthly covering, will return to

the source whence it came, just as the body returns to the dust from whence it came.

We have assumed that spirit is intelligent. That intelligence must have been infused into man, as the climax of inert matter for a purpose. What purpose could be effected if man dies as a beast dies? The few years of his existence on earth, as is said above, "would seem wholly unworthy of such a boundless material realm," as is the universe which we inhabit. In very truth, there "is no manifest reason for supposing the soul of man, made in such a divine image, to be only an ephemeral creature, going eventually to nothingness." Such a brief career is not in harmony with the aspirations implanted within, as by virtue of the God spirit—the soul. Man is evidently the highest order of being, and for what purpose could he have come into existence, with all his possible and elevated aspirations, without it was to pass beyond this finite life to progress in a future existence, far beyond anything of which he is capable of imagining while encumbered with his earthly surroundings? W. B. E.

The Production of Heat.

The marvels of scientific discovery and mechanical invention crowd upon latter day nineteenth century folk in a manner rivaling the play of kaleidoscopic figures. One accepts, nowadays, what he sees, as his fathers did of old, but, unlike them, he is not prepared to dispute the possibility of anything within the range of conception. One of the most wonderful results of application of human reason in employing an essential element of the universe for human purposes is that described in the last issue of *Bradstreet's* by Mr. Lorin Blodgett, a well-known member of the Franklin Institute of Philadelphia.

Air as Fuel.

This is nothing else than the use of atmospheric air as fuel. Air is mixed with coal gas, as everyone knows, and with hydrocarbon vapors, and the compound when burned generates a much greater heat than if the air was absent. So, too, a powerful air blast is a great economizer in smelting and reducing ores. But the new fuel is the air itself, which in a powerful blast is directed upon an incandescent substance, say coal made white hot, pure carbon or any other materials that can be made to glow. Coal hydrocarbons or what not may be employed to give the initial incandescence, but once the blast strikes the luminous body, the utmost intensity of heat is secured, apparently by the combustion of the air, and may be maintained for an indefinite period by merely preserving the incandescence of the surface and this may be done by a slight manipulation of the surface brought to incandescence, and with some slight renewal of carbonaceous material.

ANOTHER HEAT PRODUCING CONCEPTION.—Another most extraordinary discovery is that claimed by M. O. de Clausen, a Russian engineer, who has been experimenting in London with a new stove. Finding that much free oxygen escapes with the unburned fuel from chimneys, this experimenter concluded that—contrary to the ordinary theory—less draft and higher temperature are needed in order to get perfect combustion. He secures these in a stove three feet high by one foot in diameter, lined with fire-brick. Only the lower portion of the coal burns, a very small current of air being admitted to this, and passing upward sufficiently hot to cause its remaining oxygen to unite with the carbon monoxide gas in the upper portion of the coal. The products escaping into the chimney are colorless and quite cool, and if the statements made are to be accepted, less than three per cent of the possible heat is lost, instead of the 80 or 90 per cent ordinarily wasted.

THE SUN'S LIGHT AND HEAT.—Does the sun give light and heat to the earth directly, or is heat generated by the action of the sun's rays upon the earth? is a question which has interested and puzzled many of our best scientists. The *Scientific American* refers to the matter as follows: "The sun's heat is supposed to be transferred to objects by ether waves. These are not considered to be heat, but to be capable of producing heat when they impinge upon matter. The atmosphere being attenuated and thin in the upper regions, is less heated than in the more dense portions near the earth. The heating power of the sun is also very great at high altitudes when radiating upon surfaces properly prepared to receive and absorb the heat. The nearer we approach the sun, the more powerful are the radiations or ether waves."

THE MARCH OF SCIENTIFIC DISCOVERY.—Mr. John Cox, M. A., in a lecture delivered recently on "The March of Scientific Discovery," said that although the importance of scientific discovery was recognized, it was questionable whether the influence which it exerted upon modern life was fully appreciated. He referred to the great advantages which had taken place during the present century, particularly mentioning steam and electric power, the latter being, he thought, still in its infancy. By the

aid of science all quarters of the globe had been brought in daily communication, and in every department of industry, where mere brute force was required, the labor was being taken from the shoulders of men and placed upon machinery, and great scientific discoveries necessarily brought about great social changes. In the course of the lectures which he would deliver, his endeavor would be to draw particular attention to the intimate connection which existed between the different branches of science. The simple laws of motion stood at the beginning of the study, and when they were thoroughly understood, they would be able to understand the conservation of energy and the connection which existed between the different branches of science in relation to the methods by which discoveries had been made. From the time of the Greek philosophers, until 200 or 300 years ago, hardly any progress was made, but that which had been made since was very great, and it seemed likely to go on, because people had learned to rely upon facts rather than upon arguments and theories. In conclusion he said that his object was not to give any description of the latest modern discoveries, but rather to accept the march of science as a whole from the earliest principle up to the present time, keeping in view the close connection between the different branches, and by means of illustration to show the method by which it had moved forward.—*London Iron and Steel Trades Journal*.

MECHANICAL PROGRESS

A Point About Steel.

The causes from which trouble may come with steel are innumerable.

The rapid multiplication of small, portable forges is doing much to increase a certain kind of trouble with it, and, in fact, this particular cause of trouble with steel has assumed proportions of considerable importance, and by pointing out, as we propose to do, some of the limitations of these small forges, we hope to be able to render a service to steel-users and steel-makers, and to the makers of the forges as well.

Mechanics understand perfectly well that a hammer must bear some proportion to the size and weight of the piece of steel that is to be forged with it; but it is not so generally understood that this is also true of the fire and forge in which the steel is heated. Of course, we do not mean to say that a different size of forge should be used for every variation in weight of work; but we do mean to call attention to the fact that a furnace suitable for heating for a steam hammer is unfitted for tempering small drills and taps, and that a small portable forge is utterly unfitted for heating a steel die weighing 20 pounds or more.

Such forges have their uses, to which they are well adapted, but when a large piece of steel, such as a drop or trimming die, is to be heated for hardening, the conditions necessary to the success of the operation cannot be secured with such a forge. It is well settled that when such a piece of work is to be heated, there must be a good body of clear fire, and that a considerable bed of the fuel must be below the work, between it and the tuyere openings. Then the character and distribution of the blast must be such as to keep this body of fuel at a nearly even temperature, and while its volume may be large, it must not be fierce and sharp, but mild and gentle.

Just the opposite of these conditions are present with a small portable forge. No large body of fuel can be heated evenly upon it; the blast coming from a few small tuyere openings, closely grouped together, must be sharp in order to get sufficient heat, and the result is an effect similar to that of a blowpipe, with intense surface and local heating, instead of the evenly distributed low heat absolutely essential to success in hardening such work. Then, too often, when the work cracks to pieces in quenching, the steel-maker is blamed.

Of course, there is little of this particular kind of trouble in the large shops, for in them regular forges are always found, and it is to the owners of the small shops, particularly where "rooms with power" are hired for manufacturing purposes, that this is addressed, in the hope that it may show some one a cause of trouble with steel, not previously suspected.

Such small forges as we refer to are excellent for the class of work for which they are intended, and small tools can be hardened with them as well as with any other forge, especially if charcoal is the fuel used; but it should be recognized that they, like most other things, have their limitations. It should be remembered, too, that pure, soft water is a good, if not the best quenching liquid, and that water in which more or less washing of hands with soap has been done is not pure water. The water and the tub containing it should be clean.—*American Machinist*.

A NOVEL STEAM ENGINE.—One of the most recent plans of engine construction assumes to overcome some of the peculiar difficulties hitherto experienced, by a duplication of all the moving parts. The engine is an upright, and has one cylinder fitted with two pistons, these approaching each other to within a very small clearance in the middle of the cylinder. There are three cranks, the middle one directly connected to the lower piston, and the two outer cranks set at 180° from the middle one, so that

when the center crank is descending, the outer cranks are pulling upward; the outer cranks are connected by rods to a trunnion ring sliding over the lower cylinder, this ring being moved up and down by means of two rods extending to a cross head at the top of the engine operated by the piston rod of the upper piston. The engine is single-acting, and steam being admitted between the pistons, they are forced apart, the upper one exerting power on its upward, and the lower one simultaneously on its downward stroke, the return stroke being performed by the momentum of the fly-wheel. The steam is admitted by a double piston valve, the outer valve acting as a fixed cut-off valve, the engine being governed by a throttling governor and running at 100 revolutions per minute. The arrangement of two pistons moving simultaneously in opposite directions has the advantage of completely relieving the main bearings of any pressure. The pistons are made extra long to reduce wear, which in the case of the lower piston is a point of especial importance, since the cylinder itself acts as a guide. Springs are introduced into the various bearings.—*Eng.*

Modern Boiler Shops.

In these days of enormous pressures, special tools are required to handle the very heavy plates of which boilers are now made. An English boiler shop is thus described in *Engineering*:

In the boiler shop the plates are taken in in the center bay, and, having been marked off, are planed on the edges, the edge planers taking 30 feet in length and 8 feet across. The plates are taken up the center bay, the work being done on them while in the straight. At the top of the bay there are large vertical rolls, recently erected, which will take plates 12 feet wide and bend 1½-inch steel plates cold. The end plates are drilled, manholes out, etc., in the center bay. When the shell plates are bent to the required radius, they are taken to the next bay and bolted together. They are then drilled in position by the ordinary drilling machines designed for this purpose. The end plates are flanged by a hydraulic press, furnace holes having been cut, etc., and rivet holes drilled in position. The back plates, combustion chambers, etc., are then put in, and the whole riveted up. For the latter purpose there are hydraulic riveters, one shell riveter of 150 tons and having a gap of 12 feet 3 inches. The work, as stated, is well arranged so as to prevent, as far as possible, the same ground being twice covered and there are hydraulic cranes well arranged for handling the parts.

Among other tools may be noticed another hydraulic riveter with power of 90 tons and a gap to take a ten-inch plate; an oval hole-cutting machine for manholes, with variable eccentricity up to seven inches; a boiler back-stay drilling machine, with two standards, and having a vertical range of 12 feet and a bed 30 feet long. The hydraulic flanger referred to has a power of 150 tons, and is capable of flanging steel plates 19 16 inch thick. The shell drilling machine has a range of ten feet vertically and an angle of drill up to 25 degrees.

ARMOR PLATE.—It has been stated that armor plate composed of steel containing an alloy of nickel has shown a greater power of resistance than plates of pure steel. In a more recent contest, held at Annapolis, nickel steel plates which had been subjected to a process of superficial carbonization were shown to be greatly superior to the ordinary nickel steel. Four kinds of plate were tested—pure steel, nickel steel; pure steel subjected to the carbonization process, and nickel steel likewise treated. The pure steel plate was smashed to pieces; the treated steel plate stood the test better, but the treated nickel plate was practically unharmed, the projectiles being broken. It is estimated that this discovery will reduce the weight of armor by about 25 per cent; that is, armor of 25 per cent less thickness will afford the same degree of protection as before. If the degree of protection formerly afforded is allowed to remain as the standard, coal capacity and other accommodations may be greatly increased. The carbonization process was the invention of H. A. Harvey of Newark, N. J.—*Eng.*

A WOODMAN'S TEST FOR AXES.—A hint which may be serviceable to ax-manufacturers as well as buyers was given by an experienced Australian bushman to a new chum. "It may be useful to you when you go into a store to buy an ax. Take out your pocket-knife, open it, and hold it as if you were going to sharpen a pencil, but with the back instead of the edge toward you. Then run the back of the knife gently over the edge of the ax. If the edge turns ever so little, so that you can just feel it, the ax is all right. If it won't turn, it is too hard." Trying an English-made ax lying at hand, he said, "That's no good." The edge would not turn.

WIRE NAILS FROM STEEL PLATE.—It has always been considered impossible to cut wire nails from any material except wire, but it is reported that an ingenious arrangement has been introduced into a mill in Pittsburgh which enables wire nails to be made from steel plate. This invention may be attached to the ordinary cut-nail machine, and is said to be capable of producing perfectly formed nails in greater quantity than is possible by the present wire nail.—*Philadelphia Record*.

GOOD HEALTH.

Swallowing Pins, Twigs, Etc.

Several cases of accidental swallowing of things other than food have come to notice since the lamentable death of Rev. Dr. Bothwell of New York, who recently died from swallowing a cork, which lodged in his windpipe. The first is that of a locomotive engineer, who, several years ago swallowed a piece of wood. He was subsequently treated for consumption, on account of violent coughing, but without the other usual accompaniments of such a disease. One day the man had an unusually severe fit of coughing, accompanied by a violent pain in the trachea, in which something seemed to have lodged. With an supreme effort, he ejected it, and it was found to be a piece of wood about an inch long and of the thickness of a lead-pencil. It was thickly coated with mucus and as black as coal. A slight hemorrhage followed, after which the patient felt great relief. He then recollected that one day while running his train he stopped at a depot, beside which there grew an apple tree. He carelessly broke off a small twig and put a piece in his month. The train again got under headway, and, while running at full speed, he saw a bull on the track a few yards ahead of the engine. He quickly applied the airbrake and reversed his lever, in order to render the inevitable shock as light as possible. In the sudden surprise, coupled with the strain of throwing back the lever, he made a convulsive inspiration, and unknowingly inhaled the piece of twig, but, in the excitement, forgot all about the swallowing until it was ejected as above. He completely recovered under the care of Dr. Downs of Brooklyn, New York.

Another case is one which also closely parallels that of Dr. Bothwell. It is related by the *Baltimore Democrat*, of a late date, that Annie Glaesner, aged six years, is dying from the effects of a pin sticking in her throat, which two weeks ago she drew in with a breath in the same manner in which the Rev. Dr. Bothwell inhaled the cork. The accident occurred in school. The child was suddenly seized with a violent fit of gagging. After the paroxysm, she informed the teacher that she had been holding the pin between her teeth, when, in an effort to yawn, she drew it down her throat. She was taken to a hospital, but as yet the doctors have been unable to locate the pin. At times the child suffers terribly, and then she will not feel it again for several hours. The throat is swelling, and it is feared that blood-poisoning has set in.

We have not yet seen any report of the result; but such accidents should be a warning against the too common practice of unnecessarily placing such things in the month. There is always great danger in doing so.

DON'T GET SEASICK.—Lemons, oranges, champagne—all these are recommended, says the *Ladies' Home Journal*, but the best recommendation, the most practical and common sense, is to let the seasickness have its way, and then you are over with it. You can modify any possible attack by a little care as to diet a day or two before sailing, by avoiding greasy and rich foods, and this is wise. But don't go on board with the settled idea that you are going to be sick. Dismiss the thought. Keep on your feet the first day out. Walk up and down the deck continuously. By this method you get accustomed to the motion of the ship, tire yourself out, and, if you are any sort of a sleeper, you will sleep soundly the first night. Then the worst is over. But if not, and you do get sick, just accept it philosophically. Of course, you will feel miserable. But let the spell run its course, and it is done; and you are better for it, and certainly wiser than to try and cure it by a mixture of things, which only give the stomach a reason for a continuance of proceedings. One of the leading medical authorities in the world says that 15 grains of sulphate of quinine, administered two hours or four hours at the most before embarking, will completely free even sensitive subjects from the horrors of seasickness.

HOW TO AVOID A MAD DOG.—A good thing to know is that a mad dog never turns aside from the course he is running to bite anybody. So if one is right in the path of a rabid animal he can get out of all danger by jumping to one side and out of the path of the dog. But if it is absolutely impossible to get out of the way, the man or woman should stand perfectly still and face the dog. He will turn aside then himself and run in a different direction, while if the person in front of him sreams and runs away, as nine out of ten will do, the dog will overtake and bite the victim. Of course it requires courage to stand still and face a rabid dog, terrible as this animal always looks, but the result shows that the real danger lies in taking flight.—*Pittsburg Dispatch*.

DANGER IN FRENCH CANNED GOODS.—Extensive investigation by the Massachusetts Board of health into French canned vegetables has resulted in the order prohibiting their sale in Boston. In every sample tested, it was found that metallic poison existed in the form of copper, and 27 out of 37 samples showed adulteration.

THE GRIPPE in London is attacking the horses.

USEFUL INFORMATION.

A Comparison of Young Mechanics To-Day and those of Former Times.

Few of the young mechanics of the present time appreciate the many advantages by which they are surrounded, making comparison with the situation as it was a generation ago. The young mechanic who thinks it harder to take the front rank at the present time than it was for his father to achieve excellence in the same pursuit in his time, should be reminded of the many advantages which he enjoys that his father knew nothing about. In his father's time there were no technical schools. Text books on mechanical subjects were almost unknown. No mechanical papers were published. Mechanical dictionaries were unheard of things; large factories never dreamed of maintaining circulating libraries for the benefit of the mechanics employed. Popular lectures on mechanical topics were not thought of. Free night schools for instruction in drawing had never been attempted.

And these are only a few of the many advantages that surround the young mechanic of the present time, the intelligent improvement of which will lead him on to success. It is with him, however, as with children who frequently have too many toys; they soon learn to think so little of them as to fail to appreciate their actual value. So many advantages are crowded upon the young man of the present day as to leave him little opportunity of considering their value, or of learning to appreciate their worth. It is for this reason, with others, that so few of the mechanics who are surrounded with exceptional advantages reach eminence in their trades.

A qualification that the mechanics of 40 or 50 years ago possessed, and which is sadly lacking in the youth of the present day, is self-reliance and enterprise. Our boys have so many helps, and things are so generally prepared for them, both in the public schools and in other departments of our educational system, that they acquire the habit of abject dependence. They fail to acquire the habit of asserting themselves and investigating upon their own account. To this difference is to be ascribed, in many cases, the failure of the mechanics of the present day to profit by the unusual opportunities by which they are surrounded.—*Blacksmith and Wheelwright*.

REGULARITY OF HABIT.—One of the most difficult of all minor habits to acquire, says *Iron*, is that of regularity. It ranks with that of order. The natural inclination of most persons is to defer work to be done until the last possible moment, or to put it off to another time, where this can possibly be done. Yet habits of regularity contribute largely to the ease and comfort of life. A person can multiply his efficiency by it. We know persons who have a multitude of duties, and who perform a vast deal of work daily, who set apart certain hours for given duties, and are there at the moment, and attend rigidly to what is in hand. This being done, other engagements are met, each in order, and a vast deal is accomplished, not by strained exertion, but by regularity. The mind can be so trained to this that at certain hours in the day it will turn to a particular line of duty, and at other hours to other and different labors. The very diversity is retained, when attended to in regular order. But let these run together, and the duties be mixed, and what before was easy is now annoying and oppressive, and the exact difference between persons is at this point. There are those who confuse and rush, and attempt to do several things at once, and accomplish little, while others will quietly proceed from one duty to another, and easily accomplish a vast amount of work. The difference is not in the capacity of two men, but in the regular methods of the one, as compared with the irregular and confused habits of the other.

A HINT FOR CIGARETTE SMOKERS.—We clip the following from the *Poughkeepsie Eagle*, and give it for what it may be worth. We trust, however, it will not result in any encouragement of the pernicious habit of cigarette smoking, as, even if it be true, it accomplishes nothing in the way of removing the unhealthy effects of such practice: A gentleman whose lungs are not strong enough for him to enjoy the fumes of tobacco after a dinner party, took with him to a friend's home a little lamp which he set on a table when the cigars were lighted. Over the flames of this little lamp was a ring of platinum, which became red-hot in a very few seconds, and which consumed the smoke of a dozen cigars as fast as it was made, so that the atmosphere of the room was as clear as it would have been had there been no smoking going on at all.

TEN CENT PIECES.—The superintendent of the Philadelphia Mint says that ten cent pieces, instead of weighing as much as a silver dollar, as formerly, only weigh about nineteenth as much.

THE PATENT OFFICE at Washington has a printed circular which it sends to inventors of machines for "perpetual motion," setting out the fact that the thing is an impossibility.

VOLAPUK.—Upward of 300 business houses throughout the world conduct a portion of their correspondence in Volapuk.

STEAM BOILER NOTES.

USING STEAM EXPANSIVELY.—One volume of water heated until it is converted into steam at atmospheric pressure becomes increased to 1011 volumes. A very ready way of remembering this is, to put it that one cubic inch of water converted into steam at atmospheric pressure becomes one cubic foot of steam. This is so nearly true that the figures may be used for all practical purposes as follows: $12 \times 12 = 144 \times 12 = 1728$; while the real product of converting one cubic inch of water into steam is 1711—only 17 inches in excess of the figures first given. The most economical way to use steam is to use it expansively. Where this is done, the cylinder is only partly filled with steam, the remainder of the stroke being carried out by that steam being allowed to expand. When hot steam is in contact with the water it has been generated from, it is known as *saturated steam*. There is no law governing the relationship of its pressure to its volume. The thing is empiric, so to speak, and has to be determined by experiment for every temperature. The results of such experiments are to be found in published tables, but it is not as with steam that has been removed from the surface of the water that generated it, but is kept as hot as the latter. Then it is known as *non saturated steam*; then it acts as a perfect gas. It is governed by a definite law known as Boyle's or Mariott's law. Boyle, by the way, was an Englishman and Mariott was a Frenchman. They both experimented, and found the law out at about the same time, so they both get the credit of it. That law is this: The volume of gases—air, coal, gas, natural gas, hydrogen, steam in the *non saturated* condition, etc.—varies inversely as the pressure—that is, if you double the pressure you have the volume, and *vice versa*.

BRIGHT THOUGHTS FOR STEAM ENGINEERS.—No one furnace is best for all fuels, and rarely for more than one. It pays to have men of brains as well as brawn and muscle, even for firing fuel and watching water. It is to the furnace we must look largely for the ability to meet the sudden fluctuations in demand for steam. It is well to understand that there is no such thing as "burning smoke," but furnaces can be made to produce a minimum quantity. Set down all claims to the evaporation of over 12 pounds water per pound of combustible (unless it be oil, gas or hydrogen), under any conditions, as made ignorantly or with an intention to deceive. When we consider that, in constant running, a boiler, to speak figuratively, eats its head off every three or four months, it is plain that a reasonable additional cost for an economical boiler is a first-rate business investment. In other words, a boiler which would save ten per cent of the coal would pay 30 to 40 per cent on its cost annually, and would be cheap at a round price as against another as a gift.—*Modern Light and Heat*.

A NOVEL FORM OF CONDENSER has been successfully introduced in Germany and other parts of the Continent. The exhaust steam from the engine passes through a series of brass pipes immersed in water, to which it gives up its heat, and between each section of tubes a number of galvanized disks are caused to rotate. These disks are cooled by a current of air supplied by a fan, and pass down into the water, cooling it by abstracting the heat given out by the exhaust steam, and carrying it up where it is driven off by the air current; the disks serve also to agitate the water, and in this way aid in abstracting the heat from the steam. With this arrangement, and with 85 per cent vacuum, the temperature of the cooling water shows about 130° F., and a consumption of water for condensing is assumed to be less than a pound for each pound of steam condensed. For an engine 40 or 50 inches, 70 revolutions per minute and 90 pounds pressure, there is about 1150 square feet of condensing surface. Another condenser of 1600 feet condensing surface is used for three engines, 32 inches by 48, 27 by 40, and 30 by 40, respectively.

DANGER IN THE FLUES.—After prolonged official investigation, the most extensive and complete destruction of steam boilers on record has been attributed to the sudden ignition of coal gas, mixed with air, that had accumulated in the flues. The explosion occurred July 25, 1887, in Upper Silesia, Germany. Twenty-two boilers, each with more than 1000 square feet of heating surface, were instantly blown to pieces, holdings covering half an acre were destroyed, and three men were killed.

AN ENGLISH INVENTOR, desiring better lubrication of indicator pistons has an internal reservoir formed in the body of the piston, so that the steam pressure, acting on the surface of the lubricant, forces it through small outlets into a groove on the outer surface of the piston. The piston is thus continuously lubricated and the oil under pressure in the groove forms a packing. One piston full of oil will last while taking 24 diagrams.

COMPETITION.—The close competition in the machinery interests is what puts on the market the best machines human ingenuity can devise. If it were not for this competition, there would be little inducement for the machine-builder to spend money in making improvements.

SHOP NOTES.

The Accuracy of Handwork.

A writer in a late number of the *American Machinist*, says: "One of the principles upon which the accuracy of handwork much depends, is that having made a test of the work, the cutting tool held in the hand, can be applied to reduce only the high places, without touching the low ones. This can go on indefinitely, so that the work finally becomes as accurate as the test is capable of detecting."

The test of finding the high places by rubbing one piece upon another is one of the most delicate in the whole range of machine-shop practice. In order to form an idea of the delicacy of this test, let us rub a cylindrical piece, one inch in diameter, upon a surface plate. Now, if in the cylindrical piece we rub off a flat place six one-thousandths of an inch wide, which is the width of lines on a common scale, we shall reduce the piece only one-hundredth of an inch. Hence, with a perfect surface plate, this test for the straightness of a cylinder is far more delicate than any other that I have spoken of.

The perfection of surface plates is also an example of this test. We have not yet made a machine that will make plates as nearly perfect as they can be made by hand."

[The finishing of the object glass of a telescope of the magnitude of that in the Lick telescope at Mt. Hamilton is, perhaps, the most pronounced example of perfection in hand finishing which can be cited. There are, probably, but two or three men living who can do such work as perfectly as in the case mentioned. No machinery could possibly be devised that could make any close approximation to it.—*EDS. PRESS*.]

"In every test," continues the writer alluded to, "we may be met by difficulty from the elasticity or springing of the pieces. To illustrate the elasticity of hardened steel, let us have it in the forms of a one inch plug and a closely-fitting ring. Now, take another plug a ten-thousandth of an inch larger, and we shall find that it can be put into the ring, when well oiled, and that it may be moved easily, as if not fitted tight."

"To file two templates so as to exclude light, requires a touch as delicate and as true as that of a musician or of a painter. A minute's watching an expert in such work, will convince any one that he must be eminent in his specialty."

And now comes the thought that presents itself through a variety of phases—Can a man be pre-eminent in any specialty without paying too dear a price for his eminence? Is the fact of this eminence a clog to his being fairly proficient, or, perhaps, companionable in general lines of thought? If this workman carries thoughts of his work home with him in the evening, and has them on Sundays, and is never happy unless he is working to a thousandth or the ten-thousandth of an inch, it seems to us that he is not getting quite all out of life that he ought to get. I should like to be acquainted with him, to know what books he reads, and how he thinks. I hope to know more of him some time.

AWKWARD MECHANICS.—Mechanics are often addicted to what can only be called awkwardness. In getting at a new or strange piece of work, some men make so much fuss, and appear to such poor advantage, that surprise is expressed that such an incompetent man should be employed. Most of this awkwardness, or "fumbling," could well be avoided by the man if he would only see himself as others see him. His attention is too much taken up by some detail of the matter, and he does not comprehend the whole amount of his work. A thorough mechanic gives a thing a thorough thinking over before he proceeds to execute any work. If the awkward mechanic would learn to think more, he would appear to much greater advantage, and would be worth more money to his employer.

BALL BEARINGS FOR ENGINE SHAFTS.—Roller or ball bearings for engine shafts have not met with success enough to warrant adoption generally. A popular make of roller bearing, recommended and used on our wheels, was tried on the air engine at the late Mechanics' Fair in this city, but worked so unsatisfactorily it was removed. While it seems to work well enough for a continuous rotary motion it did not stand the thrust of the connecting rod on the centres. This was where the difficulty came. There is a chance here for inventors.—*Boston Journal of Com.*

GERMAN ENGINEERS are said to be adopting new lining for bearings, composed of compressed vegetable parchment. When lubricated with an emulsion of mineral oil and water the parchment becomes impregnated with the oil and will last for a considerable time.

SHOP HINTS.—Never lay tools or other things on belts that are standing still, for they may be forgotten and cause a break-down when the machinery is started. If babbit is used for the boxes use only a good material; do not adopt the common mixture of tin, antimony and lead.



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MECHANICAL PROGRESS.—A Point About Steel; A Novel Steam Engine; Modern Boiler Shop; Armor Plate; A Woodman's Test for Axes; Wire Nails from Steel Plate, 358.

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MINING SUMMARY.—From the Various Counties of California, Nevada, Arizona, Colorado, Idaho, Montana, New Mexico, Oregon, Utah, Wyoming, 356-357.

MINING STOCK MARKET.—Sales in the San Francisco Stock Board, Notices of Meetings, Assessments, Dividends, etc., 364.

MARKET REPORTS.—Eastern and Local Metal Markets; Coal and Coke, etc., 364.

Business Announcements.

[NEW THIS ISSUE.]

Gold Mines for Sale.—S. B. Fowler, Grass Valley.
Dividend Notice.—Pacific Coast Borax Company.
Situation Wanted.—Engineer.

See Advertising Columns.

Passing Events.

The decision of the Supreme Court settling as unconstitutional the purchase of mining shares on a margin is quite a blow to the mining-stock business on Pine street, and the brokers are now conferring with counsel to get a clear understanding of the meaning of the decision. If as broad as it appears, it will interfere greatly with mining-stock sales; and if of general application, must affect speculative sales in other branches of business as well.

Times are bad for miners at Batte and Anaconda, Montana, owing to the shutting down of the mines and smelters at Anaconda, which threw some 3000 men out of work. There are too many miners also in some of the new Idaho camps. It is just as well for miners elsewhere to stay away from the Northwest for the present.

The acquittal of Mr. Kerr, proprietor of the Occidental foundry, for killing Edward Coogan in defending himself, and an employe from a gang of strikers, was to be expected, and is a rebuke to those men of the unions who tried to carry their points by riotous acts.

Mining Stocks on Margins.

The Supreme Court has rendered a decision to the effect that selling mining stock on margin is not lawful, which has created quite a stir among the brokers and the stock exchanges. The particular section of the Constitution under which the Court ruled, reads: "All contracts for the sale of the capital stock of a corporation or association on margin or to be delivered at a future day shall be void, and any money paid on such contracts may be recovered."

The appeal to the Supreme Court, which resulted in this decision, was made in the case of Geo. B. Root et al. vs. William F. Cashman. Cashman dealt in mining stocks on margins with a broker named Hooker. Hooker's business went into the hands of an assignee, and Cashman was sued for \$2,347, the amount of indebtedness which appeared against his name on Hooker's books. In the lower court, the plaintiff got judgment. Cashman appealed, holding that the debt was illegal, and the contract to pay void under the Constitution.

The lower court held that the stock was purchased by Hooker as agent of and belonged to Cashman, and that Hooker never sold stock to or bought from Cashman. No part of the indebtedness, therefore, arose from the sale of stock on margin or otherwise. The broker did the buying and selling of the stock, and the customer took the gains or paid all the losses arising from the transactions.

The Court calls attention to the fact that it was to put a stop to just such transactions that the quoted clause was placed in the State Constitution, and such a prohibition, says the Court, is of little worth if it can be evaded by so simple a device. "A party wishing to purchase on margins has but to interpose his broker, who is to carry the stock instead of the original owner. This would not diminish the evil. In fact it is the very form of the evil mainly intended to be prohibited."

In the accomplishment of the unlawful purpose, the Court holds, the broker put himself in the position of vendor and carried the stock as the vendor might have done, and the end was thus reached. The end attained, and not the form of the transaction, must determine the question. It is ordered that the judgment be reversed, and a new trial be given. In so deciding that in buying and holding stock for a customer the broker takes the position of a vendor, the Supreme Court makes every broker in Pine Street amenable to the law of the Constitution, and suits innumerable will result.

CRUISER No. 13 is to be built at Bath, Me., and not in San Francisco, as was hoped for. The bids were as follows: Cramp & Sons, Philadelphia, \$2,745,000; Union Iron Works, San Francisco, \$2,793,000; Bath Iron Works, Bath, Me., \$2,690,000. The result was a complete surprise to nearly every one, as the Bath Iron Works is comparatively a new competitor in the construction of steel vessels.

E. N. RIOTTE, of New York, died in North Carolina a few weeks since, where he was building a gold mill. Mr. Riotte was for many years a resident of this city, where he was engaged in business as a metallurgist and assayer with Mr. Luckhardt and with Mr. Kustel. He was known all over the coast as a mining expert, having visited most of the prominent districts on professional business.

A PARTIAL eclipse of the sun occurs on hour and twenty minutes after sunrise on Saturday morning. In San Francisco the total obscuration will be about one-third and the eclipse will last one hour and forty minutes. The eclipse begins here at 6h., 10m., 42 sec. A. M. and ends 7h., 48m., 28 sec.

MRS. LELAND STANFORD'S monument to Father Junipero Serra, the founder of the California Missions, was unveiled at Monterey, on Wednesday last, with appropriate ceremonies.

MR. W. E. WEST, manager of the sampling works of W. J. Chamberlain & Co., of Austin, Nev., is arranging for the establishment of sampling works at Cerin.

CHARLES STEPHENS, Secretary of the Trustees of the Academy of Sciences, died suddenly of heart disease while at work in his office, on Wednesday.

The Late J. M. Buffington.

J. M. Buffington, who was one of the best-known mining secretaries on this coast, died at his home in Oakland on Saturday, in his seventy-third year. Mr. Buffington came from his birth-place, Somerset, Mass., to California, June, 1849, and, like all the pioneers, immediately engaged in mining. He was fortunate in his work, and in about a year was enabled to start in business in San Francisco, where he became interested in a ship-cracker bakery, which proved successful. After some years in this business, he again engaged in mining, and was interested as a stockholder in many of the more prominent mining companies in this State and Nevada.

During his life, he has had charge of the financial affairs, as secretary of over a hundred mines. He continued to act as secretary for a number of prominent mining companies up to the time of his death, although he had accumulated a handsome fortune.

His residence on Oak street is one of the finest in Oakland, and one in which he took great pride. Mr. Buffington was active in church affairs and established the first Sunday-school in Stockton. He was acting President of the Young Men's Christian Association of Oakland for six years, and for the past few years has been its honorary President. The deceased was a prominent member of the Scottish Rite of Masonry and was a thirty-third degree member.

Mr. Buffington has been quite feeble for many months and his death was not unexpected. He has always been a man of affairs, active and industrious. He enjoyed the confidence of the mining magnates of the coast and was an officer of some of the most noted Oomstock mines during their palmiest days. He was a man of exceptional personal integrity, respected by all with whom he had dealings. While quiet and unassuming in his ways, there were strong points in his character which made him many warm friends. Mr. Buffington leaves a handsome fortune to his heirs. There was a large assemblage at the funeral, the Rev. Drs. Dille and Benton conducting the ceremonies. The Y. M. C. A. quartet rendered selections. The pallbearers were: E. W. Playter, N. W. Spaulding, W. E. Miller, Hiram Tubbs, E. W. Marston, George E. Whitney, E. B. Deane and J. L. N. Shepard.

MEXICAN LEAD ORES.—The Secretary of the Treasury has concluded the consideration of question of the examination and assay at El Paso of ores containing lead, and which are destined for other ports of entry or delivery at which there are smelting works. The Collector at El Paso is authorized to forward such ores under warehouse and transportation bonds, the examination, weighing and assay to be waived at that port, and to be made at the port of destination. Bonds will be taken in the usual form, the penalty being fixed at double the estimated duty. In estimating the duties, the entire importation will be regarded as lead ore. The merchandise must be forwarded to destination in sealed cars, and by duly bonded routes.

At Red Mountain Camp, Colorado, a meeting of American miners has been held to protest against the action of the management of one or two large mines, which, it is alleged, give employment to miners recently from the old country, in preference to residents and citizens who have blazed the trails and opened up the country.

MINERS ARE WARNED to stay away from Idaho. There are said to be ten applicants for every vacancy at the De Lamar mines, and the Seven Devils country, although landed by the Idaho papers last year, as one of the wonderful mining camps of the country, is now admitted to be a place that poor people should keep away from.

PRENTICE MULFORD, who has written many stories of mining life and early days of California, was found dead in his canoe on Sheephead bay, last Saturday.

THE *Daily Alta California*, after having been published in San Francisco for 42 years, has gone out of existence. It has been unprofitable for some years.

THE personal property tax roll of San Francisco shows an increase of \$1,245,934 over last year.

Electric Percussion Drills.

(Continued from page 353.)

to feed about 20 inches, and is designed for a hand feed. Its weight, with tripod complete, is about 400 lbs., and its length over all is 38 inches.

There is no valve arrangement, the shifting of the force being independent of any movement of the plunger, and is effected periodically at the generator. This feature makes it possible to shorten the stroke almost indefinitely. The plunger is automatically cushioned by the magnetic action of the coils, and vibrates in space without striking anything at either end of the stroke.

Every part of the machine is easily renewed, and a duplicate can be inserted in a few moments. The electrical connections with the coils are so simple, and of so evident a nature that no experience is required to make them, and they cannot be made wrong.

In introducing the wires through a mine, a simple expedient insures the certainty of unskilled persons always making right connections of the wires.

Blasting is easily effected by touching the wires from the blast to the connection on the cable, and 50 or more blasts may be simultaneously exploded, if desired. Owing to the intermittent character of the current, it cannot hold an arc, and there is thus no danger of fire.

The short, rapid stroke of the machine is very effective in cutting hard rock, and very easy on the cutting tool. The coils cannot burn out, and are impervious to moisture, being hermetically sealed. They are easily removed.

Another cut on page 353 shows the electric hoisting apparatus for mines manufactured by the same company that makes the electric drill. The construction of the hoist is readily understood from the engraving.

The Astronomical Society.

The next regular meeting of the Astronomical Society of the Pacific will be held in the library of the Lick Observatory, Mt. Hamilton, on Saturday, June 13, shortly after the arrival of the members. To attend the meeting, members must take the 7:30 A. M. train (broadgauge) from foot of Market street (via Niles), arriving at San Jose shortly before 10 o'clock, on Saturday morning. They will be met at the broadgauge station by the stages of the Mt. Hamilton Stage Co. The start from San Jose will be made very promptly at 10 o'clock, in order to arrive at Smith Creek about half-past one. Here dinner can be had, and by starting promptly, the summit can be reached by about 4 o'clock. A meeting of the Board of Directors will be held in the library immediately on arrival, and as soon thereafter as may be, the meeting of the society will be called to order.

At 7 P. M. the domes of the 12 inch and 36 inch Equatorials are opened, and all visitors take their turns in looking at the most interesting celestial objects which are in a convenient situation.

About 10 P. M. the visitors leave, and the members of the Society will then have a further opportunity of seeing other heavenly bodies. The stages will leave the summit about 11:30 P. M. for Smith Creek hotel. The stages returning to San Jose leave Smith Creek as the members desire, in time to connect with the various trains to San Francisco.

At the meeting on Saturday, the following papers will be presented:

"The Solar Eclipse of June 6, 1891," by Orrin E. Harmon of Chehalis, Washington.

"The Thermometric Chronometer of the Lick Observatory," by A. C. Leuschner of Berkeley.

Review of Miss Clarke's "The System of the Stars," by George E. Hale of Chicago.

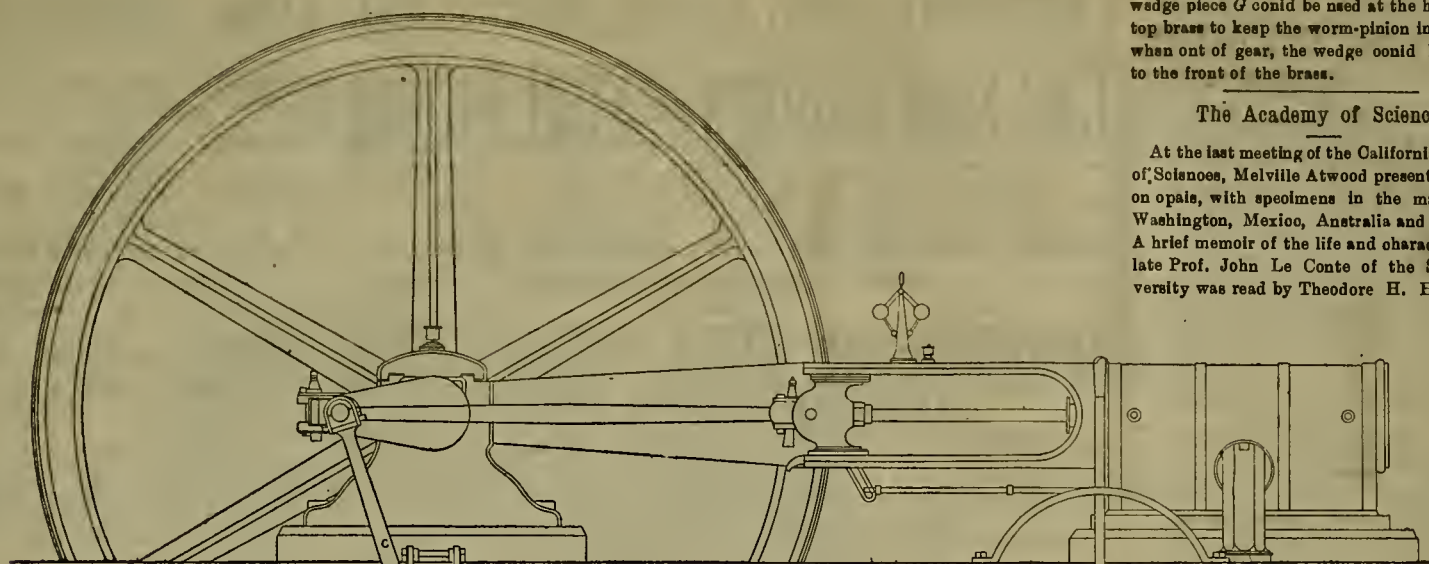
Review of Dr. Dreyer's "Life of Tycho Brahe," by Torvald Kohl of Denmark.

"The Period of the Rotation of the Sun Near the Poles, as Derived from the Coronas of 1878 and 1889," Prof. F. H. Bigelow of Washington, D. C.

"The Visibility of Interference Fringes in the Focus of a Telescope," by Prof. Michelson of Worcester, Mass.

"Observations of the Transit of Mercury, May 9, 1891," by Messrs. Burkhalter, Moses and Pierson (Oakland and San Francisco) by Messrs. Holden, Burnham, Schaeberle, Keeler and Barnard (Mt. Hamilton), by Prof. Soule (Berkeley), Prof. George (San Jose), Gen. Irish (Reno, Nev.), Mr. Parmley (Ogden, Utah) and others.

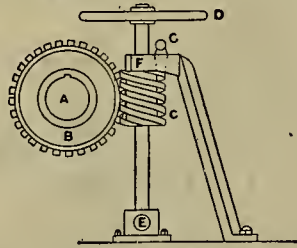
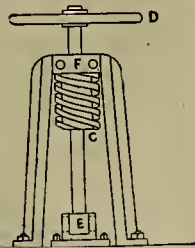
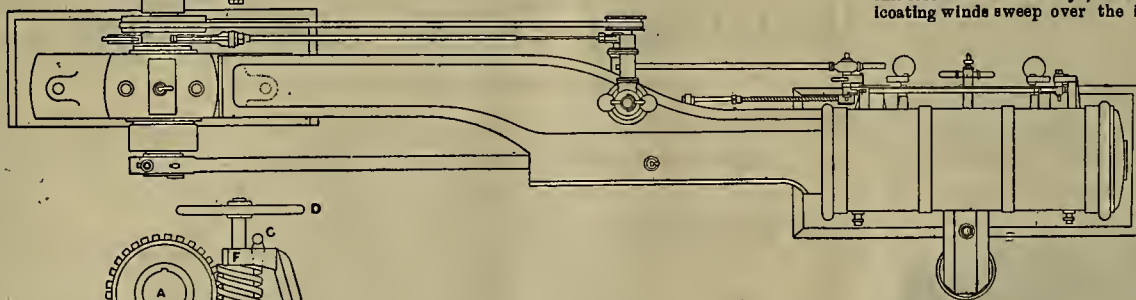
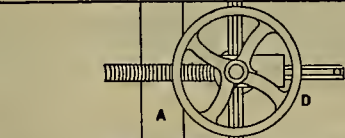
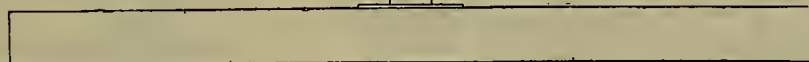
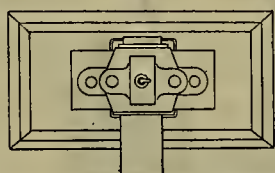
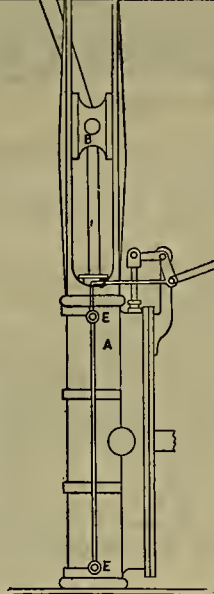
The new powder works at Clipper Gap are now running night and day.



Methods for Moving Engines.

There are different methods that can be used for taking engines off the center or dead points. In the last annual report of the Secretary for Mines of Victoria are some statements on this subject which are of general interest and application. The plan in common use to turn marine engines when steam is down could be adopted, viz., a worm-wheel is keyed on the crank-shaft; in this works a worm-pinion, which is also keyed on another short shaft, the top bearing of which is a sliding one, and by this the pinion can be shifted in or out of gear, and turned by means of a hand-wheel on the top.

Another method is to fix a small auxiliary cylinder vertically under the crank-shaft (if the engine is a horizontal one). This cylinder would have a piston and rod, cylinder ends, and a connecting-rod to the crank-pin of the large engine, also slide-valve and rod, and a large cock on each end of the cylinder. These cocks and the valve could easily be worked by one handle from where the engine-driver stands.



METHODS FOR MOVING ENGINES WHEN ON A CENTER.

The opening of the valve would shut the cocks, and vice versa. The power used could be either steam, compressed air, or water, and would be under perfect control.

When a large engine is centered, the engine-driver can open the port by the slide-valve and admit the power used on either the top or the bottom of the piston, to suit the direction in which he required the crank to move; and when it was off the center the ports would

then be closed, and the auxiliary cylinder would not be required again except the crank again stopped on the center.

The disadvantage attending this plan is, the small piston would require to be propelled up and down in the cylinder by the crank; but, the cocks being open, there would not be much friction.

Instead of turning off the power, the small cylinder might be kept always at work, and so

assist the large engine; but in this case additional appliances to work the small slide-valve would require to be added.

A method of moving an engine when the crank is on the center is shown in Diagram No. 1, printed herewith.

The cylinder *A* is fixed vertically under the center of the crank-shaft, and from the cross-head *B* the connecting-rod *C* is fixed to the crank-pin, which is made a sufficient length that will allow a journal outside the journal of the main connecting-rod.

The slide-valve is worked by the handle *D*, and when this handle is in the center of the quadrant, as shown, both ports are covered; by moving the handle *D*, the power is admitted either on the top or bottom side of the piston, as required. The handle *D* also works the two large cocks *E E*, which are so arranged that opening the ports shuts the cocks, and closing the ports opens them. By this arrangement, when the power is shut off, the open cocks

wedge piece *G* could be used at the back of the top brass to keep the worm-pinion in gear; and when out of gear, the wedge could be shifted to the front of the brass.

The Academy of Sciences.

At the last meeting of the California Academy of Sciences, Melville Atwood presented a paper on opals, with specimens in the matrix from Washington, Mexico, Australia and Hungary. A brief memoir of the life and character of the late Prof. John Le Conte of the State University was read by Theodore H. Hittell and

was ordered spread upon the minutes of the society.

The address of the evening was made by Lieutenant Finley, in charge of the Signal Service, whose subject was "The Hot North Winds." He said that the general idea of these hot desiccating winds that prevail in California at certain seasons, and which do so much damage at times to orchards, farms and gardens, is that they are of local origin, but he was prepared to show this idea to be erroneous. He explained by means of a series of charts that the meteorological changes in climate noticed in the State proceed from conditions that are created over an immense area of territory that begins among the Aleutian Islands and that ends only at Mexico.

In order to have accurate and timely warnings of the approach of these hot seasons, stations should be established in the Aleutian Islands, at Sherlock, British Columbia, and be connected by telegraph with San Francisco. All this will require money, however, which the Government does not see fit to provide. Reports are made regularly in British America, but they are not received here for six months, so they are of little practical value. The speaker then proceeded to show that the hot winds are produced by certain climatic changes in this part of the State proceeding changes in the cyclonic centers of storm areas, which are clearly marked and can be traced for days before their effects are noted at the various stations.

When certain barometric conditions occur the interior of British Columbia, Eastern Oregon, Washington and the interior valleys of California are shut off from the trade winds for days and weeks. When the entire extent of lava beds, alkali plains and deserts receive the full force of the sun's rays, then these hot, desiccating winds sweep over the land for three

prevent friction in the cylinder.

Another method (see Diagram No. 2) which is used to move marine engines when steam is down could be adopted. The crank-shaft *A* has the worm-wheel *B* keyed on it, and the worm-pinion *C* being turned by the hand-wheel *D* causes the crank-shaft to revolve. When required to be taken out of gear, the step brass swivels in the bottom bracket *E*, and the top brass slides back in the top bracket *F*. *A*

days and inflict serious injury to every kind of vegetation. The moment the conditions change a sudden fall in temperature takes place, which is frequently remarkable for its variation.

Lieutenant Finley said that the only remedy for this wind is to plant trees or grass upon the alkali plains and to cultivate the lava beds. If farmers in the interior valleys would plant rows of quick-growing trees for wind-breakers, as was done in Nebraska a few years ago, there will be something to protect their crops.

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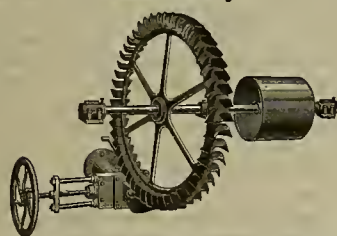
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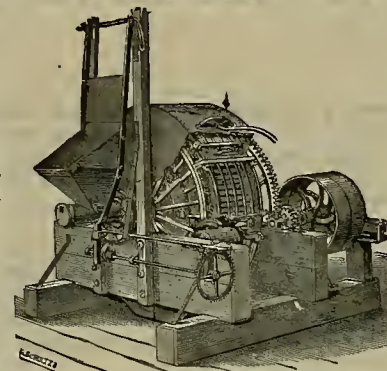
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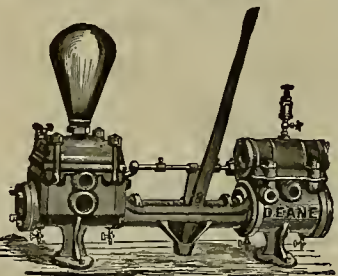
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APPLICATIONS FOR MINERAL PATENTS
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By J. S. PHILLIPS, M. E.

The work is divided into four parts—Rocks, Veins, Testing and Assaying. The geological chapters are intended to give miners a practical idea of the various formations. The chapters on mineral veins are derived from long observation, and the section on exploration has been carefully considered. All that relates to discrimination and assay of minerals has been kept as free from formulae as possible. The work is written for practical men, and all the explanations and descriptions are clear and to the point. It is so prepared that it is useful to uneducated men as well as scientists.

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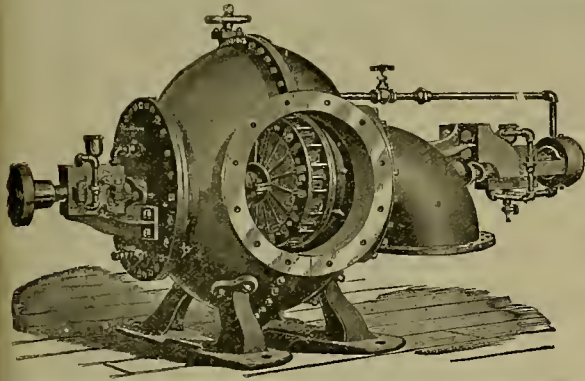


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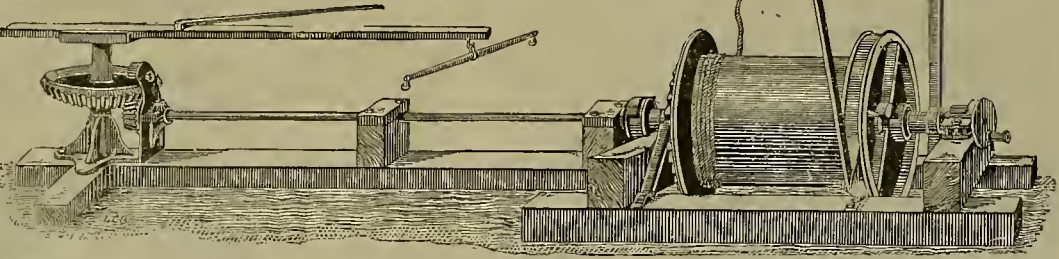
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Testing and Working Silver Ores

A VALUABLE BOOK. An illustrated work of 114 pages, for miners and prospectors, by Chas. H. Aaron. Mr. Aaron has managed to give many useful hints and suggestions, free from all technicalities, and in such a style as to be easily comprehended. It is written for the miner, with no chemical symbols or metallurgical technicalities to confuse those who are not chemists or metallurgists. The following summary of the contents of the work will give an idea of its scope. Under the heading of the first chapter, "Testing Ores for Silver," we find paragraphs on ore formation, test for silver, with heat and water, acid or blow pipe. In speaking of testing for a process, the extent and richness of ore is considered, smelting ores, selecting and working samples, appliances for testing, roasting, etc. Under the head of "Working Ores" the author describes Aaron's process, has something to say of superheated steam, preparation of dichloride of copper and protochloride of copper, use of copper and iron, quantity of chemicals, carbonate of lime, chloride ores, amalgam, Pathe's process, etc. He also describes the methods of working roasted ores, treatment of base metals, stirring, heat of furnace, want of sulphur, etc. Under the head of "Leaching Processes" are the titles Smelting, Mexican process, Chilean process, Kroll's process, etc. Under "Pulverizing Machines" are described the arastra and its construction and operation, stamp batteries, screens, Crocker's trip-hammer battery, Paul's pulverizing barrel, Kendall's battery, Noice's pulverizer, a cheap rock breaker, etc. In speaking of amalgamators the author describes a cheap amalgamator, grinding the ore, directions for making a barrel, preventing mechanical wear, use of quick-silver, copper in bars, Freiberg barrel, cheap barrel trough, barrel on rollers, Aaron's amalgamator, separator, etc. He describes an improvised retort, roasting furnace, furnace tools and furnace building. Among the miscellaneous mention may be found Aaron's leaching apparatus, with two or three different arrangements, a small mill, sampling tailings, and settling tanks, dichloride of copper, etc. Mr. Aaron is a practical miner, of long working experience on this coast. Price, post free, \$2.00. Sold by Dewey & Co., Publishers, 229 Market St.

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MARKET REPORTS.

Local Markets.

SAN FRANCISCO, June 4, 1891

It has been many years since the business community entertained a more hopeful feeling regarding the general outlook for a prosperous season than is now prevalent. The cool weather has insured a much larger grain crop than a month ago was thought possible, which with the certainty that prices will average from 20 to 30 per cent more than for three years past, inspires confidence that the various industries will be greatly benefited. To make the latter doubly certain, the large crop of fruit, hay, etc., is being marketed at good prices. The mining districts also report favorably. Present indications justify us in stating that the money which will be disbursed to farmers and orchardists this season will aggregate fully 100 per cent more than paid out for crops in the season just past.

MEXICAN DOLLARS—The market is quiet at 77@77½c.

QUICKSILVER—Receipts the past week aggregate 200 flasks, and the exports by sea 100 flasks to Mexico. The market is quiet but apparently steadier.

SILVER—Purchases so far in this month reported by the Department at Washington, aggregate as follows:

Date.	Offered ounces.	Purchased ounces.	Price paid per ounce.
June 3.....	944,000	329,000	\$.97

The market has not undergone any material change. Our advices indicate a more hopeful feeling of the metal, and acting on it, large operators at the East and in Europe are not disposed to press the market, but on the contrary are more reserved in their offerings. The late stringency in the European money markets was, it is said, taken advantage of by a moneyed clique, which bought all the gilt-edged securities they could whose value is largely contingent on that of silver. On this coast no perceptible increase in the output of silver is reported, but that in gold is said to show a slight gain.

BORAX—Exports by sea the past week aggregate about 1500 tons to New York. The overland shipments to the East are said to be quite large. There is an easier feeling in the market.

LIME—Receipts the past week aggregate 9385 bbls. It is reported that concessions are obtainable. The demand is unusually large for building purposes.

LEAD—The market is strong at an advance. The low priced poor stuff on the market, it is said, has been cleared up. The East is strong and higher owing to heavy purchases having cleaned up all pressing lots on the market.

TIN—Imports of plate the past week aggregate 14,987 boxes plate from Liverpool and 2400 boxes by rail from the East. The market for plate is barely steady. For pig the market is weak.

COPPER—The market has a stronger tone. New York mail advices report stocks accumulating and buyers offish. London cable to the *Iron Age* May 28 is as follows: Active speculative buying caused a further rise in prices of Copper early in the week, and while business has been on a smaller scale the past few days, there is yet a good consumptive demand that sustains the market.

IRON—Imports the past week aggregate 300 tons pig from London. There is nothing coming to hand from up north, the iron works in Washington and Oregon using the output. With us the market is weak and unsatisfactory. The very low freights from European ports to California admit of free shipments.

COKE—Imports the past week 1000 tons from England. The market is barely steady.

COAL—Imports the past week aggregate as follows: Tacoma 8,400 tons, Departure Bay 7,855, Sydney 3,300, Philadelphia 200, Coos Bay 1,150, Nanaimo 7,497, Hakodati 2,350, Seattle 1,100, Swansea 1,500, Newcastle, N.S.W. 1,220. Total 34,582. A reduction is noted in two brands. At \$9.00 a ton Wellington is selling for less than ever before in this market. The coast collieries are sending more coal to this market. This promises to be a season of universal low prices for coals. Our large wheat crop is attracting vessels, and not to come in ballast they accept very low freights. It is claimed that a vessel at Antwerp has been taken at 8s per ton for this port and this is the lowest freight on record from that port to this. This charter is given by us to show the influence on the coal market here.

Eastern Metal Markets.

By Telegraph.

New York, June 4.—The following are the closing prices the past week:

	Silver in Silver in London.	New York.	Copper.	Lead.	Tin.
Thursday.....	44½	97	13 00	4 32½	20 30
Friday.....	44½	96½	13 05	4 32½	20 40
Saturday.....	44½	97½	12 90	4 42½	20 70
Monday.....	44 5-16	97½	12 90	4 45	20 70
Tuesday.....	44 5-16	97½	12 90	4 45	20 70
Wednesday.....	44½	97½	13 00	4 45	20 80

Borax is steady at last rates. Quiksilver, 60¢/oz; fair trade. Tin is higher but easy at the advance. Lead is strong and more inquired for. Copper, although reported unchanged, appears to be working into better shape.

Our Agents,

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

GEO. WILSON—Sacramento Co.
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G. B. GILL—San Luis Obispo Co.
E. L. RICHARDS—Escondido, Cal.
F. S. CHAPMAN—Tulare Co.
B. F. BRIL—Shasta Co.
J. H. P. WILLIAMS—Tulare Co.
A. S. COOLEY—Tehama Co.
W. U. WADSWORTH—Sutter, Yolo and Yuba Cos.
E. H. SCHAEFFER—Central California.
W. M. HILMARTY—Oregon.
W. M. HOLMES—Oregon.

Mining Share Market.

The mining share market ruled heavy, with slight fluctuations throughout the past week, but this has been according to the prearranged program, so as to "freeze" all outsiders they can out of stock. It is still in the program to send prices to slightly lower figures, and then start a new deal. So as to facilitate outside selling, more assessments are in order. The writer still has faith in the market, and has good grounds on which to base his opinion that higher prices will obtain in this year than any time since 1886, but that we are to have a market is out of the question for so far nothing has been found lately in any one of the mines to warrant more than a deal. The writer has also good grounds on which to base the assertion that there are other stocks that will make a larger percentage to buyers than will Con. Virginia, although the latter will doubtless be used as a lever with which to handle the market for with it, it can be done to better advantage. The pool is using the summer vacation "racket" and other plausible cock-and-bull stories to destroy confidence so as to not only keep outsiders from buying but get them to sell, both of which they are doing to perfection. Nearly all who bought during the recent advance have sold out—many at a heavy loss. Of course they swear they will not buy again, but experience has taught the pool that the fools are not all dead. They throw out the bait and the latter rush in and with their money soon part. Who the pool will get to expert on the next ore development so as to sell stock, as they did in Con. Virginia, is not known. It would seem as if this method of victimizing outsiders has been played enough. Comstock superintendents experted on the Tuscarora district, reporting rich ore, etc., and Tuscarora stocks have not stopped going down from that time to date. A \$20 piece will pass current anywhere and the holder will not sell it for \$10. So it is in a mine, insiders are not apt to have a mine expected to sell stock, unless they have good reasons to believe that the ore in sight is not worth the market price of the stock.

The Supreme Court decision on trading in stock on a margin, was a God send to the pool, for by its publication they gained good lines of stock. The decision in question is good and will do no little in purifying the putrid air of Pine Street. It is one that all honest brokers should rejoice in, for it will bring honesty to the front, and in so doing will allay all fears now entertained by outside moneyed men in investing in stock. That part of the Constitution, on which the decision is rendered was evidently framed to prevent any knowing or underhanded way of doing business by a broker whose instincts are far from honest. It is well known that there are some broker firms that do not buy stocks for customers when they have reason to believe the market is going down. They report purchases, which were never made, and, vice versa, when ordered to sell stock and they have reason to believe that the market is going up. It is these that the law is aimed at. To bring the business within the confines of the Constitution and make the transaction a legitimate business one, there are two ways, viz: In all purchases of stock, the buyer or customer is entitled to and should know the number of the certificate of stock, date issued, from what broker purchased, and the price, and this stock is held by the broker for the buyer as collateral against all moneys advanced. The buyer can at any time come in and get by paying all claims against it, that particular stock. Again, the transaction can be closed by the customer giving his note for the remainder of the sum due. In this note drawn one day after date, an agreement can be incorporated that the stock held, giving number of certificate, can be sold when its market value falls below a certain percentage. Of course with clippers this cannot be done, but as they close their transactions almost daily, it is not necessary, yet even with them some kind of written agreement is best. By decision of the Supreme Court, proxy voting at election is a thing of the past, for a person can and should be prosecuted for voting stock not his own, although standing in his or her name as trustee. It is a good decision and all honest brokers should rejoice it has been rendered.

From the Comstock mine our advices are of a still more encouraging character and dealers will find that what we have said about rich ore in some of the mines, will be fully verified before many weeks pass. One or two mines whose shares are selling below \$2 or \$2.50 will come to the front before long. Con. Virginia battery assays are higher, as are Challars. That they can be made still higher as are Overman and other bullion-producing mines is not questioned by any one. The prospect work along the entire lode is of a very interesting and important character. It is more extensive and better systematized than for years. Good results are as certain to follow as the sun will rise on to-morrow. From the outside mines the news is of an encouraging character. In the Bodie district rich ore is being taken out for future milling, probably after an assessment is levied by the Bodie Mining Co. In the Tuscarora district, two or more of the mines have more bullion on hand than the stock is selling for; why it is kept back is a question and gives color to a report of a big deal soon in that district. From the Quiftoas nothing new is at hand.

Coal and Coke.

SPOT FROM YARD—PER TON.	TO LOAD—PER TON.
Wellington.....	\$ 9 00 Australian.....
Greta.....	8 60 Liverpool Stm.....
Carlton Hill.....	8 00 Scotch Splint.....
Nashua.....	9 00 Cardiff.....
Gilman.....	6 50 Lehigh Lump.....
Seattle.....	7 50 Cumberland bk 10 00—
Coos Bay.....	6 00 Egg, hard.....
Cannel.....	9 50 West Hartley.....
Egg, hard.....	14 00
Cumberland, in sacks 14 00	
do, bulk.....	13 00
Walsend.....	9 00
Scotch Splint.....	6 00
Brymbo.....	8 50 To load.....
West Hartley.....	8 50 Spot, in bulk.....

Coke—English.

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Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

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ASSESSMENTS.					
COMPANY AND LOCATION.	No.	AMT.	LEVIED, DELINQ. AND SALE.	SECRETARY.	PLACE OF BUSINESS.
California Iron & Steel Co., California.....	6.....	35c.....	April 27, June 6, June 27.....	F Bonanchina.....	433 California St
Carmelo Land & Coal Co., California.....	3.....	50c.....	April 11, May 16, June 16.....	W T Baggett.....	374 Pine St
Con Imperial M Co., Nevada.....	31.....	5c.....	May 6, June 11, July 1.....	O L McCoy.....	331 Pine St
Cons Pacific M Co., California.....	13.....	10c.....	June 1, July 1, Aug 6.....	F E Luty.....	310 Pine St
East Sierra Nevada M Co., California.....	23.....	3c.....	April 14, May 22, June 15.....	R Spinner.....	330 California St
Gray Eagle M Co., California.....	23.....	3c.....	Apr 3, May 18, June 9.....	A W Barrows.....	303 California St
Guasancaran & Cal M & M Co., Honduras.....	5.....	\$5.00.....	May 12, June 17, July 6.....	Edward Oliver.....	Montgomery Avenue
Idlemw M Co., California.....	2.....	10c.....	May 1, June 1, June 24.....	E F Stone.....	316 Pine St
Live Oak Drift Gravel M Co., Cal.....	13.....	25c.....	April 15, June 2, June 22.....	Jos Morillo.....	328 Montgomery St
Inyo Marble Co., Nevada.....	10c.....	10c.....	May 26, July 10, July 28.....	G W Lucas.....	132 California St
Midas M Co., California.....	2.....	10c.....	April 27, June 10, June 29.....	A Halsey.....	338 Montgomery St
Navajo M Co., Nevada.....	21.....	20c.....	May 20, June 25, July 17.....	J W Pew.....	310 Pine St
Oak Cows M Co., California.....	8.....	4c.....	April 6, May 13, June 10.....	E J Ryan.....	230 Montgomery St
Peer M Co., Arizona.....	10.....	10c.....	May 29, June 23, July 23.....	N T Messer.....	309 Montgomery St
Peerless M Co., Arizona.....	16.....	10c.....	April 24, May 29, June 18.....	A Waterman.....	309 Montgomery St
Piedmont M Co., Nevada.....	2.....	5c.....	May 21, June 30, July 22.....	J R Scoville.....	320 Sansome St
Silver Hill M Co., Nevada.....	23.....	20c.....	April 23, May 28, June 15.....	D O Bates.....	309 Montgomery St
Scorpion S M Co., Nevada.....	26.....	15c.....	April 14, May 22, June 15.....	G R Spinney.....	310 Pine St
Sierra Nevada S M Co., Nevada.....	39.....	50c.....	May 13, June 17, July 7.....	E L Parker.....	303 Montgomery St
Union Con S M Co., Nevada.....	43.....	30c.....	May 11, June 22, July 13.....	A W Barrows.....	303 Montgomery St
Utah Con M Co., Nevada.....	12.....	25c.....	May 6, June 12, June 30.....	A H Fish.....	309 Montgomery St
Valley View M Co., California.....	2.....	2c.....	April 13, May 18, June 8.....	W T Gurnett.....	308 Pine St
Yellow Jacket M Co., Nevada.....	43.....	60c.....	April 14, May 16, June 26.....	W H Blavett.....	Gold Hill

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Alaska Treadwell Co., California.....	A T Corbus.....	420 Montgomery St.....	Annual.....	June 17
Bodie Cons M Co., California.....	B L Burling.....	309 Montgomery St.....	Annual.....	June 16

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M Co., Nevada.....	T Wetzel.....	320 Sansome St.....	10.....	May 13
North Banner Cons M Co., California.....	T J Mitchell.....	Grass Valley.....	50.....	Apr 20
North Star M Co., California.....	D A Jennings.....	401 California St.....	50.....	Apr 8
Pacific Coast Borax Co., California.....	A H Clough.....	230 Montgomery St.....	1 00.....	June 10

The Mining Companies' Financial Standing.

The following is the financial standing on the first Monday of the present month of the mining companies listed on the two exchanges in this city:

ARIZONA MINES.			
Cash.	Debt.		
Crocker.....	\$ 4,789		
Locomotive.....	1,371		
Peerless.....	681		
Footless.....	5,626		
Silver King.....	3,474		
Weldon.....	1,165		
BODIE MINES—CALIFORNIA.			
Bodie Con.....	16,730		
Bulwer.....	7,694		
Mono.....	6,692		
Standard.....	6,907		
Syndicate.....	3,101		
COMSTOCK MINES—NEVADA.			
Alpha Con.....	22,451		
Alta.....	13,747		
Andes.....	29,194		
Belcher.....	8,084		
Best & Belcher.....	1,993		
Bullion.....	5,491		
Caledonia.....	15,899		
Challenge Con.....	3,497		
Chollito.....	35,288		
Confidence.....	981		
Con. Cal. & Virginia.....	160,762		
Con. Imperial.....	25,596		
Con. New York.....	7,073		
Crown Point.....	2,236		
Excelsior.....	3,723		
East Sierra Nevada.....	9,123		
Gould & Curry.....	9,123		
Hale & Norcross.....	3,892		
Julla Con.....	1,638		
Justice.....	8,965		
Kentuck.....	15,181		
Lady Washington.....	20,830		
Mexican.....	24,774		
Occidental.....	1,299		
Ophir.....	2,538		
Overman.....	3,015		
Potosi.....	41,412		
Savage.....	49,367		
Seg. Belcher & Mides.....	11,063		
Scorpion.....	7,902		
Sierra Nevada.....	14,247		
Silver Hill.....	17,154		
Union Con.....	14,396		
Utah.....	14,396		
TUSCARORA MINES—NEVADA.			
Belle Isle.....	21,831		
Commonwealth.....	5,435		
Del Monte.....	5,552		
Grand Prize.....	7,477		
Independence.....	12,800		
Navajo.....	8,119		
Nevada Queen.....	8,119		
North Belle Isle.....	8,119		
North Commonwealth.....	8,119		
MISCELLANEOUS MINES.			
Eureka Con.....	3,474		
Holmes.....	187,332		

- (A) With bullion to arrive and assessment being collected.
(B) Bullion on hand valued at \$70,765, with further shipments to return not all in.
(C) Collecting assessment.
(D) A sum of \$12,800 due from other companies as an offset.
(E) 6,837 ounces silver unsold and further shipments to arrive.

Sales at San Francisco Stock Exchange.

THURSDAY, June 4, 9:30 A. M.			
100 Alpha Con.....	90c	200 Justice.....	35c
300 Alta.....	80c	200 Kentuck.....	35c
750 Andes.....	2 05	300 Lady Wash.....	25c
120 Belcher.....	1 55	300 Mexican.....	30c
420 Best & Belcher.....	4 05	100 Nevada Queen.....	25c
350 Challenge Con.....	1 60	100 N Con with.....	65c
400 Ohallor.....	2 50	300 Occidental.....	1 05
1100 Con Cal & V.....	10 25	500 Ophir.....	5 00
200 Confidence.....	5 00	100 Sierra Nevada.....	1 50
100 Con Imperial.....	1 50	300 Potosi.....	4 40
1000 Con New York.....	20c	400 Savage.....	2 20
100 Crocker.....	15c	150 Seg Belcher & M.....	150c
150 Crown Point.....	1 65	200 Union Con.....	2 15
400 Excelsior.....	85c	200 Utah.....	65c
200 Gould & Curry.....	2 10	300 Yellow Jacket.....	2 35
80 Hale & Nor.....	2 15		
100 Julla.....	15c		

Table of Lowest and Highest Sales in S. F. Stock Exchange.

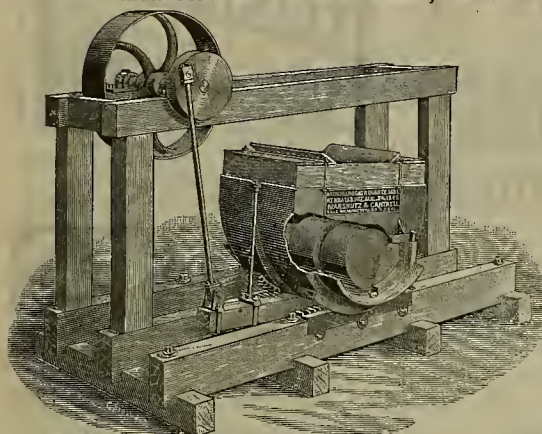
NAME OF COMPANY.	WEEK ENDING May 24.	WEEK ENDING May 21.	WEEK ENDING May 23.	WEEK ENDING June 4.
Alpha.....	1.25	1.60	1.00	1.35
Alta.....	1.16	1.30	.90	1.30
Andes.....	2.76	3.45	1.75	3.00
Belcher.....	2.80	3.40	2.00	2.30
Belle Isle.....	.60	.40	.70	.55
Best & Belcher.....	25	8.50	4.80	5.60
Bodie.....	2.25	2.00	2.50	2.00
Bullion.....	1.20	1.35	1.00	1.15
Bulwer.....	.40	.45	.30	.35
Calendonia.....	85	1.00	1.00	1.10
Con. Va. & Cal.....	15.75	15.50	20.00	11.37
Challenge.....	2.50	3.00	2.45	1.80
Chollar.....	3.20	3.92	2.16	3.30
Confidence.....	6.50	7.37	6.00	5.75
Con. Imperial.....	20	24	15	20
Caledonia.....	.99	1.10	.60	.55
Crown Point.....	2.10	3.00	2.16	1.90
Crocker.....	20	25	20	15
Del Monte.....	30	33	35	30
Eureka Con.....	30	1.10	.60	.70
Excelsior.....	.90	1.10	.66	.90
Grand Prize.....	25	30	15	25
Gould & Curry.....	3.40	4.00	2.10	2.65
Hale & Norcross.....	3.20	3.95	2.05	2.35
Julia.....	.25	.15	.25	.15
Justice.....	1.35	1.40	1.10	1.35
Kentuck.....	.70	.85	.40	.50
Lady Wash.....	.40	.50	.25	.45
Lehigh.....	.70	.50	.40	.55
Mexican.....	1.25	5.12	1.15	5.37
Navajo.....	25	40	25	30
North Belle Isle.....	.80	.85	.65	.75
Nor. Cal. & Virginia.....	.40	.50	.20	.40
Neve. Queen.....	.40	.50	.20	.40
Occidental.....	1.30	1.50	1.00	1.15
Ophir.....	7.12	9.05	5.00	6.12
Overman.....	3.55	4.40	2.50	3.20
Potosi.....	4.20	5.12	3.75	4.20
Peerless.....	.20	.25	.15	.20
Peerless.....	.20	.25	.15	.20
Savage.....	3.10	3.90	2.10	2.60
S. B. & M.....	1.35	1.75	.95	1.75
Sierra Nevada.....	6.30	1.05	2.10	2.30
Silver Hill.....	.40	.35	.15	.40
Union.....	4.00	4.80	2.00	4.30
Union Con.....	.30	.35	.20	.30
Union Con.....	.30	.35	.20	.30
Utah.....	1.30	1.45	1.60	1.80
Yellow Jacket.....	2.80	3.25	.40	2.85

L. C. MARSHUTZ

T. G. CANTRELL.

NATIONAL IRON WORKSN. W. Corner Main and Howard Sts., San Francisco,
—MANUFACTURERS OF—**Stationary and Compound Engines, Flour, Sugar, Saw
and Quartz Mill Machinery.****AMALGAMATING MACHINES. CASTINGS AND FORGINGS** Of Every
ALL WORK TESTED AND GUARANTEED.**IMPROVED PORTABLE HOISTING ENGINES.****NATIONAL ROCKER QUARTZ MILL.**

KENDALL'S PATENT, AUGUST 24, 1886.

CAPACITY, 12 Tons in 24 Hours. 3 H. P.
MARSHUTZ & CANTRELL, Sole Manufacturers.

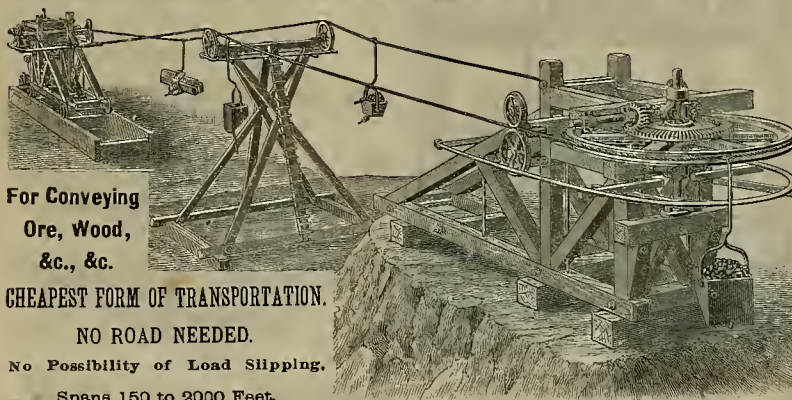
The Patentee and Manufacturers cordially invite miners to critically examine and pass judgment upon this improved system of milling and amalgamating ores in the following particulars:

1. The cost is less than one-half of stamps of same capacity.
2. The freight to mine is less than one-half of stamps.
3. The cost of erecting is less than one-fourth of stamps.
4. The power to drive it is less than one-half of stamps.
5. The wear is less than one-quarter of stamps.
6. There is no wear except on shoes and dies.
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8. In its simplicity of construction.

We challenge competition with Stamps, Ball Pulverizers or and other ore crushing machines now before the public.

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SAN FRANCISCO, CAL.**MINING MACHINERY.**GOLD AND SILVER MILLS, ROCK BREAKERS, PANS AND SETTLERS, ROASTING
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(Patented)For Conveying
Ore, Wood,
&c., &c.**CHEAPEST FORM OF TRANSPORTATION.**

NO ROAD NEEDED.

No Possibility of Load Slipping.

Spans 150 to 2000 Feet.

**LIDGERWOOD MFG. CO.,**
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300 Styles and Sizes. Over 7000 in Use.
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Send for Catalogue.

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OLDEST and LARGEST Manufacturers in the United States of

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Extra Rubber Belting and Hose

For Mining Purposes.

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Jobbing of every description promptly attended to.

FINE WORKMANSHIP GUARANTEED.

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U. S. A.**HOSKIN'S PATENT BLOW-PIPE AND ASSAY FURNACES.**

—FOR—

Chemists, Assayers, Metallurgists, En-
gineers, Jewelers, Dentists, Etc.**NO DUST! NO ASHES!****Portable! Practical! Automatic! Economical!**

Will do for every thing that a Coal Furnace or Gas

Furnace will, and WITHOUT A BLOWER.

Send for Price List and Descriptive Circular to

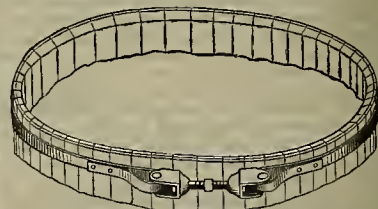
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IT HAS NO EQUAL.

POSITIVELY FIRE-PROOF.

Can Be Put On
by Any One.Adopted by the
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Non-Heat-Conducting Material.N. E. CORNER
PACIFIC & DAVIS STS. — **C. B. JOHNSON & CO.** — SAN FRANCISCO.**BLOWING ENGINE FOR SALE.**

Vertical pattern, with half-diameter, air cylinder 40 in. diameter, stroke 24 in. 1 to 100 strokes per minute, engine new. For price and particulars **JAMES LEFFEL & CO.,** Springfield, Ohio.

**BAND COUPLING.**

Malleable Iron. All Sizes.

These Couplings are the best in the world, most powerful and cheapest. They have a ball and socket joint, right and left screw and work freely. We use them extensively in our Tank Building Department.

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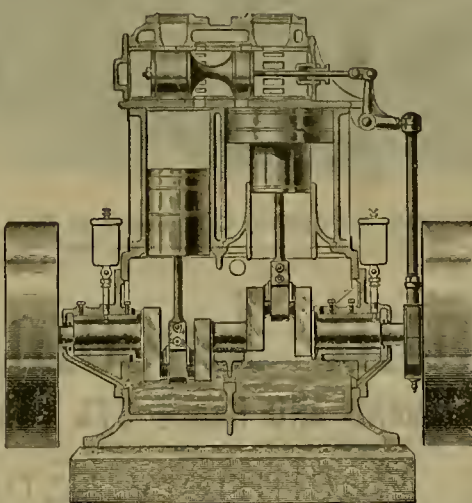
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GOLDEN GATE CONCENTRATORS,

GREATEST CAPACITY OF ANY CONCENTRATOR MADE,

One Machine Taking Pulp from 10 Stamps.



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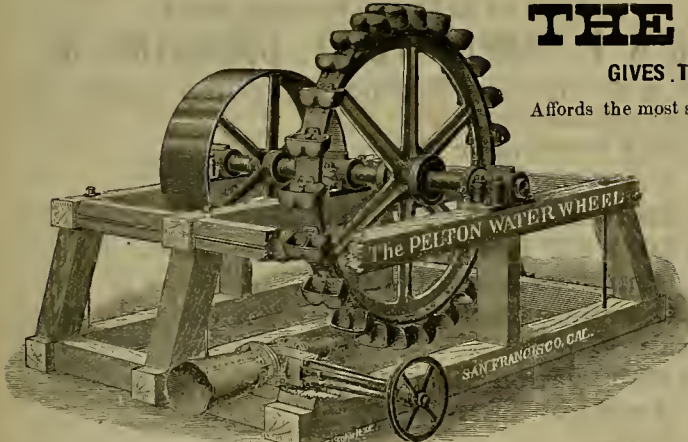
STANDARD, 99 ENGINES, 4500 HORSE POWER.

JUNIOR, 166 ENGINES, 4260 HORSE POWER.

Grand Total, 309 Engines, Aggregating 13,975 Horse Power.

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189 Clarence St., Sydney, N. S. W.



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GIVES THE HIGHEST EFFICIENCY OF ANY WHEEL IN THE WORLD. OVER 1300 IN USE.

Affords the most simple and reliable power for all mining and manufacturing machinery. Adapted to heads running from 20 up to 2000 or more feet. From 20 to 30 per cent better results guaranteed than can be produced from any other wheel in the country.

ELECTRIC TRANSMISSION.

The advantages the Pelton Wheel affords in the way of a uniform and reliable power, close regulation, and the facility of adaptation to varying conditions of speed and pressure, have brought it into special prominence and extensive use for this class of work.

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UNLIMITED IN CAPACITY, UNEQUALED IN EFFICIENCY, UPWARD OF 3000 NOW IN USE.

Will do more than twice the work of any other with the same cost in wear.

Gives a fineness of product that increases the capacity of any mill from 25 to 40 per cent without any additional expense. THE BEST AND ONLY CRUSHER ADAPTED TO MACADAM ROAD WORK. Send for Circular.

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For SAVING GOLD!

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER

AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of silver and durability. Old Mining Plates Replated, Bought, or Gold Separated. THOUSANDS OF ORDERS FILLED.

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IMPORTANT TO GOLD MINERS!

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PRICES GREATLY REDUCED ONLY REFINED SILVER AND BEST COPPER USED. OVER 3000 ORDERS FILLED. FIFTEEN MEDALS AWARDED.

Old Mining Plates can be Replated. Old Plates Bought, or Gold Separated. These Plates can also be purchased of JOHN TAYLOR & CO., Corner First and Mission Streets, San Francisco.

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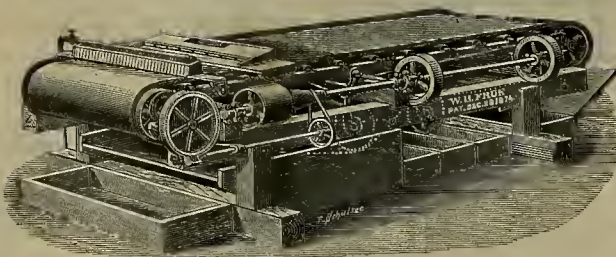
IMPROVED BELT FRUE ORE CONCENTRATOR.

The Best Ore Concentrator in the market, having double the Capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, crushing 350 tons per day, and is giving entire satisfaction as against 48 plain Belt Machines, taking the Pulp from the other 120 Stamps.

Price of Improved Belt Frue Vanner, \$825, f. o. b.
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Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1886.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

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S. E. CORNER HOWARD AND BEALE STS., SAN FRANCISCO.

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SHEET-IRON WATER PIPE for Mining and Irrigation Purposes.

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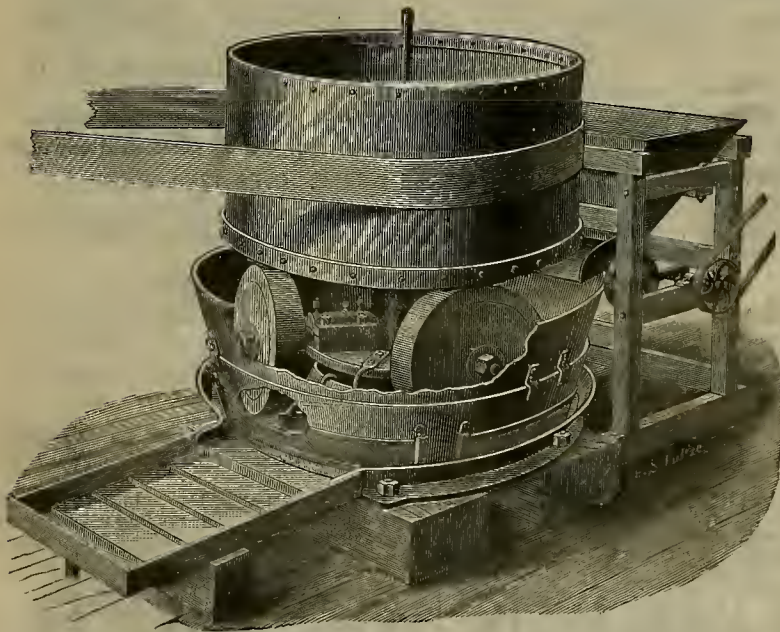
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WE HAVE ON HAND AND FOR SALE CHEAP

A 50 H. P. PUMPING PLANT, CONSISTING OF

- One 10" x 30" Corliss Engine; all pump gears; bob irons; connecting rods.
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- Three (3) Frue Concentrators.
- One (1) 10" x 18" Slide Valve Engine.



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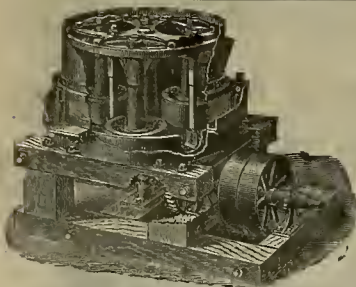
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CENTRIFUGAL ROLLER QUARTZ MILLS,

Concentrators and Ore Crushers,

Mining Machinery of Every Description. Steam Engines and Shingle Machines.

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Centrifugal Roller Quartz Mill.

213 FIRST STREET.

SAN FRANCISCO, CAL.



STAMP SHOES.

STAMP DIES.

Adamantine Shoes and Dies

— AND —
CHROME CAST STEEL

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

THESE CASTINGS ARE EXTENSIVELY USED IN ALL THE MINING STATES and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to above conditions. When ordering send sketch with exact dimensions. Send for Illustrated Circular.

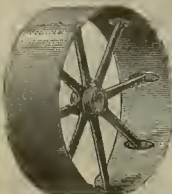
Manufactured by CHROME STEEL WORKS, Brooklyn, N. Y.

H. D. MORRIS, Agent, 220 Fremont St., San Francisco.

Special attention given to the purchase of Mine and Mill Supplies.



Stamp Die.



PAT. OCT. 25, 1881.

PERFECT PULLEYS

First Premium Awarded at Mechanics' Fair, 1884.

CLOT & MEISE,

Sole Licensed Manufacturers of the

MEDART PATENT WROUGHT BIRMINGHAM PULLEY

For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of

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SEND FOR CIRCULARS AND PRICE LIST.

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LEVIATHAN COTTON BELTING.

Superior to all Others for Quartz Mills, Smelters, &c.

Not Affected by Wet, Steam, Heat or Oils. Every Belt Guaranteed. Try It. Send for Circular and Samples.

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27 TO 33 CALIFORNIA STREET, - - - SAN FRANCISCO, CAL.

DIAMOND DRILLS

THE PACIFIC PROSPECTING CO. will contract to prospect with Diamond Core Drill for minerals, etc., or to bore holes for ventilation or drainage. Agents for Diamond Drills, Rock Drills, Mining Machinery and Supplies of all kinds. Diamond on hand. Inquiries and orders promptly attended to. 13 Sanson Street, San Francisco, Cal.

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(A Corporation.)

Constantly on hand a full assortment of Manila Rope, Duplex Rope, Tarred Manila Rope, Hay Rope, Whale Line, etc., etc.

Extra sizes and lengths made to order on short notice.

611 & 613 Front St., San Francisco, Cal

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXII.—Number 24.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, JUNE 13, 1891.

Three Dollars per Annum
SINGLE COPIES, 10 CENTS.

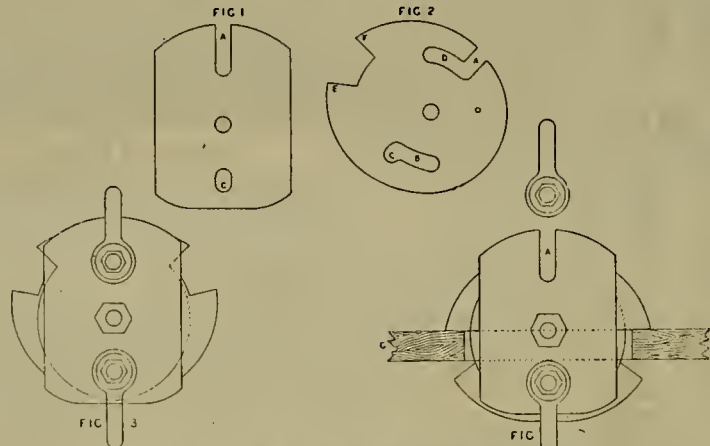
Winding Indicator and Safety Hook.

Mr. John Bowen of Maldon, Victoria, has invented a winding indicator, which is in use in that Colony and which is described in the report of the Secretary of Mines. The engraving shows the operation of the device.

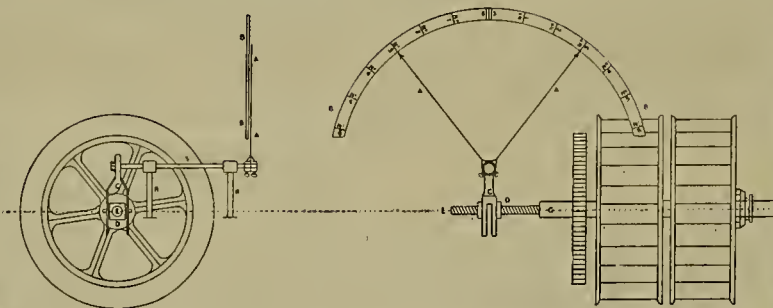
In the end of the winding-drum shaft *G* is tapped a screw *E* of the required length (according to depth of shaft). Upon this screw a square nut *D*, with corresponding thread, travels to and fro. Upon this nut the fork *C*, with slot, rides, and is kept in position by a pin in the nut *D*. The fork *C*, in connection with the rod *S*, supported by two standards *RR*, reaches the pointers *AA* on the face of the indicator, which are adjusted by set screws. The pointer next the drums is adjusted to the various levels in accordance with the loose drum.

The senior Inspector of Mines, Mr. Nicholas, in his report on the indicator, says: "This indicator is simply constructed and is accurate in its work. It is erected immediately in front of and in close proximity to the engine-driver. The signal or alarm bells strike sharply and distinctly, and so direct the attention of the driver. It is an economical and useful indicator."

Mr. Bowen has also invented a safety-hook, which is described as follows:—Figure 1 of the cuts shows the outer plate or casing; Figure 2 the eccentric plates, of which there are two, and which are placed within the outer plates and secured by a center-pin passing through each plate. To secure the top shackle, the openings *A, A* must be brought opposite to each other and the pin dropped into the openings. The eccentric plates are then pressed to the right and left, when the pin of the shackle



SAFETY HOOK FOR HOISTING WORKS.



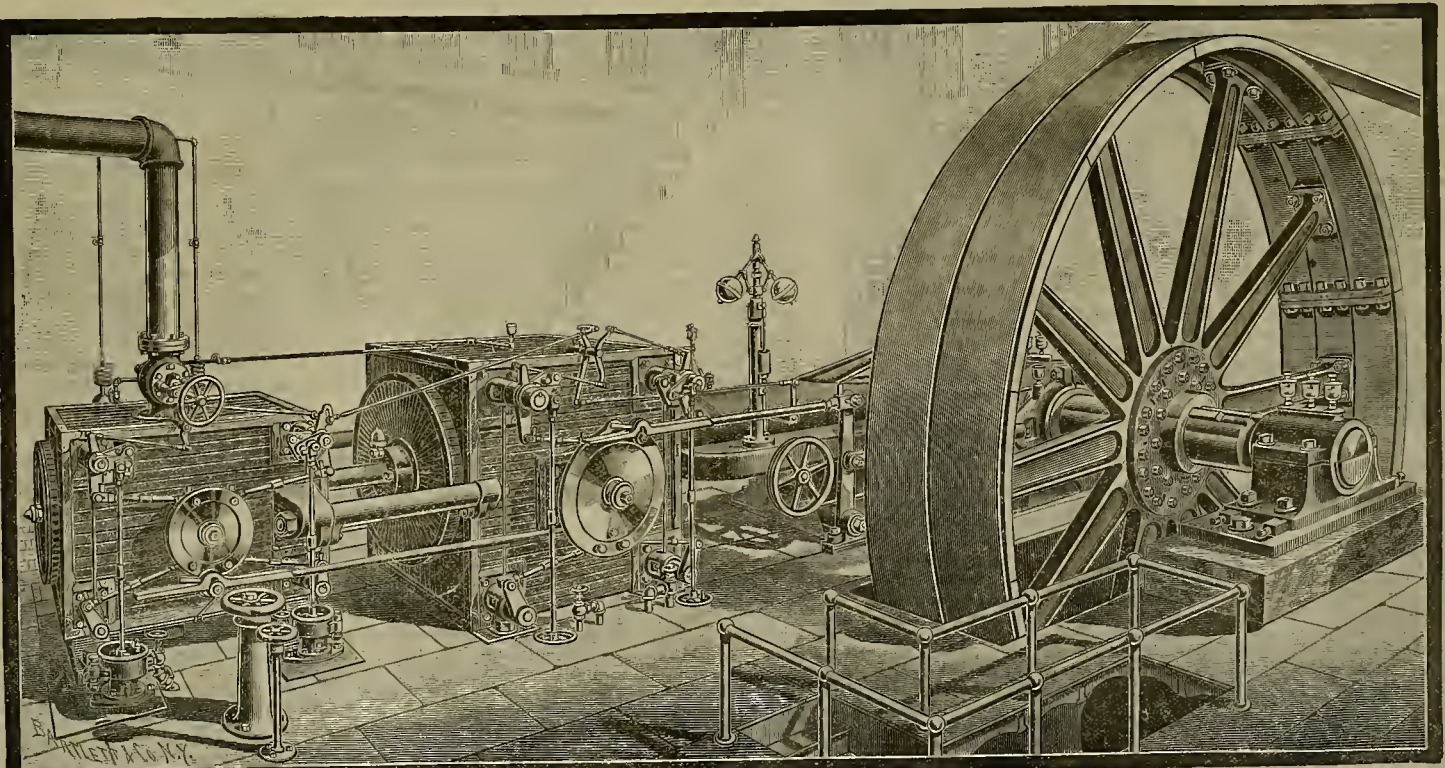
INDICATOR FOR MINING SHAFTS.

passes along to the extreme end of the slot *D*, and the shackle is secured. In a case of overwinding, the shackle passes up through the ring or circular opening in the plate *G, G* Figure 4, with which the wings *E* will come into contact, when the shackle-pins will travel along the slots *B* and *D* at bottom and top of the eccentric plates, and at the same time bring out the wings *F*, which are instantly secured on top of plate *G, G* by the pin of the lower shackle falling into the drop *C*, thus securing a suspending hook and cage, which can only be released by taking off the weight and lifting the shackle-pin out of the drop *C*. Figure 3 shows the hook closed, and Figure 4 the hook after having passed through the circular opening in plate *G, G*.

THE present annual production of fuel in Great Britain is 180,000,000 tons. It is calculated on the lowest basis that the proposed eight-hours day would diminish this production down to 162,000,000 tons, and many of the owners believe that the output would be reduced from 20 to 25 per cent. The manufacturing industries of the country consume something like 100,000,000 tons of the present output, which is less than sufficient for their demand.

A NEW amalgamating machine, to go on the Rae dredger on the Carson river, is shortly expected. It has a capacity of handling 500 tons per day. The river mining machine will soon be given a practical test.

DURING last week the Dexter Mining Company of Tuscarora shipped five bars of gold bullion, valued at \$15,000, the product of a 30 days' run with five stamps at the De Fries mill.



THE HAMILTON CORLISS COMPOUND TANDEM ENGINE.—See page 377.

CORRESPONDENCE.

We admit, unadvised, opinions of correspondents.—Eds.

Mines of Lemhi Co., Idaho.

EDITORS PRESS:—Considering the extensive mining developments, which are at the present time being so profitably pushed forward in both North and South Idaho, a few items on the outlook of a central portion of this great mining State may be of interest to your readers.

Lemhi county is situated on the western slope of the Rocky and Bitter Root mountains; is bounded on the east by Beaverhead county, Montana, and extends about 150 miles north and south by 100 west from the divide. Salmon City is the county seat, from where there is a daily stage running to Red Rock, on the Utah Northern R. R. Since 1866, Lemhi has produced, according to official reports, \$16,000,000 in placer gold, which, by the way, is a big recommendation to a county, coming as it did from shallow digging surrounded by a primary formation, and there still remains large areas of ground that could be made to yield handsome returns by the intervention of capital. The Lemhi river, which is a stream flowing not less than 5000 inches of water 30 miles above its mouth, at its lowest stage, runs along the base of the Rocky mountains for 60 miles only separated from the same by a stretch of low, rolling alluvial foothills about six miles in width which it has evidently been the means of forming.

Gravel Claims.

Trending down through these foothills from the rocky peaks of the main range, are numerous small creeks, nearly all of which, after they leave the narrow canyons, and enter the secondary formation, carry a good hydraulic prospect that only need a big head of water to make them profitable mines. Most of these streams have been worked in a small way for the past 20 years. The one that has produced the most gold is known as Bohannan Bar, situated eight miles above Salmon City. There has been about 150 acres of this gravel worked, that paid on an average \$5000 per square acre, and the bar still contains 1500 acres of the same quality. The gold is worth over \$18 per ounce, of the thick-scale order, scattered all through the gravel, with small nuggets on bedrock.

The bar constitutes an even stretch of ground nearly one-half mile wide by six miles long, with good grade. The gravel will average about 16 feet deep, with soft sediment bedrock that can be piped right into the flume, and no boulder but what will run right through a small flume.

From the natural advantages surrounding it, this gravel could be run off very rapidly with a big head of water. There has been a survey made, and it would take a ditch about 40 miles long from the Lemhi river to cover the ground. The route is quite feasible—good digging nearly all the way, and with the exception of two or three deep gulches to be piped or flumed over, does not offer any serious engineering difficulties. If this ditch were constructed as far as Bohannan creek, and then extended eight miles farther, it would cover two other creeks, one having an estimated area of 1000 acres and the other 500, the kind and quantity of gold on these properties being about the same as Bohannan and the conditions of its occurrence similar. Each one of these creeks is being profitably operated at the present time.

Water Supply.

It is only for a short time when the snow is melting that there is sufficient water in these streams to do any good; then each claim works about six men and pipes off from two-thirds to 1½ acres. These creeks are extensively developed from one end to the other by shafts, bedrock tunnels and patches worked off, and the value of the gold they contain could be quite accurately and easily estimated, and, it would seem, offers a big inducement for the investigation of heavy capitalists. The ground is held in 160-acre tracts by parties residing in this country and could be bought up at a very reasonable price per acre.

A Mountain Basin.

From Salmon City it is just 15 miles due west across the mountains to the town of Leesburg, which is the dilapidated remains of a once populous placer mining camp situated in the center of an elevated mountain basin of that name 7000 feet above sea level. The basin shows evident signs of glacial action, which has doubtless been an important factor in grinding out the precious metal from its parent lodes. It is about 15 miles long by 6 across, with gulches putting in from all directions. These diggings were mostly shallow and yielded up their dust very readily. The stream was taken off during the first few years after their discovery and the ground has nearly all passed into the hands of Chinamen, who make a good living handling over the old gravel piles and gouging around for rooker dirt. This basin has produced not less than \$12,000,000 since 1866. The bedrock is mostly decomposed granite and talc slate. There are dozens of large and small quartz veins cropping out around the heads of the gulches; some of them look very promising and give a fair prospect in free gold, but there has been very little development work done on any of them.

The main stream that drains this basin is known as Napier creek and runs very flat until it passes through a narrow gap in the

mountains, there taking a plunge of about 2000 feet in less than two miles; just before this creek enters the canyon there is a claim called the

Bull of the Woods.

It was originally the site of a shallow lake, and doubtless acted as a catch-pot for a good deal of the gold that passed over the falls. The reason why this ground was never worked is because the bedrock in the canyon is higher than it is farther back up the creek, and consequently needs quite a long bedrock tunnel to drain it, which none of the early diggers cared to tackle. There was an attempt made to drift the ground. They sunk a shaft to bedrock eight feet square near the upper end of the claim that produced \$120 in heavy gold, but in going down they passed through a stratum of quicksand, which it was impossible to keep out, so they had to abandon the attempt. The ground above this claim where bedrock was first struck, paid an ounce a day to the man to ground sluice.

There is also a bar running down one side of it that was very rich. The bedrock to be driven through to drain this ground is a soft viscid conglomerate, and ought to work easily. This property can be purchased for a reasonable figure. It comprises 320 acres, is covered by U. S. Patent and owned by Mr. Fred Phillips of Challie, Idaho. Below the falls Napier creek runs off comparatively flat again for about two miles until it joins Big Creek. Above the junction there is another 320 acre tract located. It has a shaft down 21 feet, which shows a bank of fine red gravel with a good hydraulic prospect from grass roots increasing in weight as depth is attained; but they have not got bedrock yet. The gold is precisely the same as that found in the basin above. This property is held at the present time.

The Tabor Investment Co.

Below the mouth of this creek 10 miles on Big creek is situated the property of the Tabor Investment Co. of Denver, which was purchased last January from David Lamont, et al of Dillon, Mont. The company have 40 men employed at the present time under the efficient management of Mr. W. H. Patterson. Their object is to get bedrock in the basin of the main creek, to thoroughly prospect the ground, and find out what they have got before bringing in any more machinery.

They also have an extensive bar area on both sides of the stream, on which there is a crew of men drifting and taking out money right along. The gold is coarse nearly all small flat nuggets and fine in quality. It is the theory of old miners who have worked on the bars and tributaries of this stream that if they find rough bedrock in the main channel it will be fabulously rich, and judging from the nature of the formation that crops out and the bedrock of the bars, it will be as rough as they desire. The manager, Mr. Patterson is a veteran placer miner and will doubtless come as near engineering the venture to a successful issue as any one could.

The Moose Creek Claim.

We will now retrace our steps back to Leesburg, and notice the Moose Creek claim, which is situated on the main stream of a twin basin to Leesburg, that branches off in a northerly direction. The outlet of this basin is also flat, but the creek runs parallel for a little way with a deep gulch separated only by a low narrow divide which only required cutting through with a short tunnel to give a dump of 500 feet deep. This claim is owned and operated by Mr. D. McNutt, who has taken out over half a million of dollars since he came into possession. The pay channel is about 300 feet wide and from 10 to 18 feet deep small gravel with soft granite bedrock. The gold is of extra fine quality being worth a trifle over \$19 per ounce, shaped like coarse gun powder, and is quite heavy and easily available. The ground is worked with a 4 foot bedrock flume and a six inch hydraulic giant using over 500 inches of water under a pressure of 160 feet, and there is ground enough ahead of the out to last for 50 years. A great drawback to this property has been their difficulty in controlling the water during the spring rise. The basin is covered with a dense growth of black pine timber which at this altitude holds immense banks of snow until late in the spring. Then for a while the creek will run as much water as a good sized river. If there was a large reservoir formed (for which there is an excellent site) so as to keep the surplus water from running to waste, and thus extend the piping season, the yield of gold could be enormously increased and the claim made very profitable. Mr. McNutt is one of the original pioneers of this country, and consequently getting pretty well along in years and unable to give the property the personal attention it requires, and will sell if the right man comes along and means business. It is a fine opening for any one on the lookout for a big gold mine investment.

Gold Quartz Boulders.

In traveling over the mountains, back to Salmon from Moose creek, the wagon road passes by a very peculiar deposit of free gold quartz, right on the highest divide, 9,000 feet in altitude. It is known by the euphonious title of the Snow Fly mine, and consists of a mass of float boulders, of all sizes from a pebble up to one that roughly squared 20 feet, promiscuously scattered over about three acres of ground, these were broken up and worked in a five-stamp water-power mill built for the purpose down on the creek. It is a red-stained quartz of a granular texture perfectly free milling and gave an average yield of \$50 per

ton. The mine has produced \$80,000, nine-tenths of which was taken from the boulders. There is very little development on this property under the surface, they sunk a shaft about 60 feet deep and found a 3-foot vein of the same kind of quartz, only not quite so rich. At this depth, the shaft made water rapidly which they were unable to handle and had to quit the operation for lack of capital. If they should happen to run on to the chimney that produced those huge boulders while doing their annual assessment work it will prove a veritable bonanza of free gold quartz, this property is owned by Messrs. Hogan & Phillips of Salmon City.

Salmon City.

Is beautifully situated in a level valley, at the confluence of the Salmon and Lemhi rivers, surrounded by a fine farming and grazing country, where grain, vegetables and small fruits grow to perfection.

The Lemhi has an average grade of 50 feet to the mile which affords excellent irrigating advantages, and could be made to yield almost unlimited water power for any purpose required.

From the carboniferous limestones at the south end of the county in which the sand carbonate deposits of the Viola mine have been so profitably worked, to the Kentucky free gold mine which is successfully operated to a depth rapidly approaching 1000 feet, in the granite at the north end of the county, there is as fine a natural section of "geological horizons," plentifully sprinkled with their usual associated ores, as it would probably be possible to find anywhere.

Unprospected Regions.

From the Kentucky mine, west 100 miles by about 100 miles north and south, flanked by the world famed placer camps of Florence, Elk City and Warrens, in Idaho county, there is a stretch of country practically unexplored for quartz, which offers an exceptionally fine field for prospectors.

This section of country, like most other bullion-producing, has been victimized by a class of "lake" mining operators and promoters who have given it quite a setback. Their principal stock in trade is a slick tongue and an utter disregard for the confidence placed in them. We don't have any special antipathy for the genus "Middleman," provided he understands his business and is willing to act square, as such men are a boon to any undeveloped country; but I think if investors would look a little into the credentials of mining promoters and shy off from those of shady reputation, they would save themselves many a disastrous investment.

The air is thick here with rumors of railroads that are calculated to pass this way. If they would only quit "rumoring," and materialize, they would find here a country capable of a wonderful development and furnishing an extensive traffic.

We have abundance of wet lead ores, dry silver ores, some mammoth outcrops of copper and iron; extensive tracts of the finest timber, water power in abundance, and every essential (with the single exception of transportation facilities) necessary to make a prosperous bullion-producing country, which, judging from an extensive experience and personal observation, will compare favorably (at the surface) with some of the best-developed mining districts in the Northwest.

Salmon City June 4, 1891.

Oro Blanco, Arizona.

EDITORS PRESS:—There is but one reason to show why the Yellow Jacket should be or is a larger mine than others on the same lode, and that is, there is more work done to develop it as such. Upon the surface this mine does not show as much or as high-grade ore as some of her sister claims.

On the northerly end of the above mine the surface is cut up by a good-sized canyon, which passes through the ground transversely, showing plainly a split in the ledge, and supposing the Yellow Jacket the lower stem thereof the northerly extension would form a plain letter Y; the easterly branch of said letter still containing principally gold, while on the westerly arm silver predominates.

The first northerly claim on the westerly branch ledge is owned by John Bartlett, and although it has but a 15 foot shaft, shows up a large ledge of gold and silver bearing ore.

The second claim on the same branch is the property of H. F. Diehl, and shows up a large deposit of silver-bearing ore. On this claim can be found some high-grade silver ore, as easy therefrom running as high as \$25 an ounce per ton. Five tons of ore shipped from this claim netted the owner a little over \$600, the sampling works assaying being 195 ounces per ton. Allowing \$50 per ton for transportation and treatment, and deducting the percentage of New York quotations generally allowed, you have the above net proceeds.

This claim has a 50-foot shaft off the ledge at the bottom of which there is a 65-foot cross-out, with which it is intended to tap the ledge as soon as possible. On the surface there is a four-foot ledge that will average 30 ounces silver per ton not including the higher grade of ore.

The first extension on the easterly branch of the Yellow Jacket lode is known as the Christinas Gift claim, owned by H. F. Diehl. This claim is principally gold bearing and has a 25-

foot shaft showing about eight feet of ledge matter, assaying from \$15 to \$25 gold per ton. There is ore all along the surface. The full length of this claim shows up well for the opening up of a large low-grade gold property.

The second location owned by the same party has no development work done as yet but shows similar to the above claim on the surface.

The next piece of property and the last of which I shall speak on the northerly extension of this lode is the Yellowstone mine also owned by H. F. Diehl.

There is a 50-foot and a few 10-foot shafts on this claim, showing in either place a ledge from five to eight feet in width of gold-bearing ore. The 50-foot shaft is five by seven feet, shows ore the full width and no hanging wall. Assays from this claim run from \$25 to \$30 gold per ton, and specimens assaying over \$700 gold per ton have been found. I think it safe to estimate the average of this ore to be, say \$20 gold per ton; also about five ounces silver.

The same plea for not further developing the above claims, is here given, that was spoken of in my former penning: No capital, together with the fact that about a year ago the owner was obliged to buy out his partner in order to hold the property, which cost him several thousand dollars, which has out short his development powers.

Here are a group of four or five claims in close proximity to one another, worth the attention of good business men and mining capitalists, as I am reliably informed the owner thereof is willing to risk his claims in having them further developed, and will give reasonable terms either for cash, purchase or bond.

The mining industry of to-day holds within itself more reliable and inexhaustible elements of success than at any former period of its existence, and the fact that it has not heretofore met with its merited portion in these parts, is owing to a lack of honesty and proper management by former representatives, or more properly termed, manipulators of capital, a too well-known fact to other parts of the mining country as well as here, to make further mention of.

This is by no means the extent of mining properties of value in Oro Blanco district, and in my next I will speak of other claims deserving of mention.

I. C. U.

Cyanide in Amalgamating Gold.

EDITORS PRESS:—The article of Mr. C. H. Aaron, in your issue of the 25th of April, has just come under my eye.

Many years ago an Englishman, who had acquired his experience in Columbia, brought to my attention the advantage to be derived from the use of cyanide of mercury with cyanide of potassium solution in pan amalgamation of gold.

Some time after, being engaged in milling by battery amalgamation, where the loss of gold was excessive, not to be corrected by any usual means, and scarcity of water compelled the saving of water and its continuous use, I experimented with the cyanide of mercury and found excellent results, not equal to those described by my English friend as resulting from its use in pans, but such as made a very important difference in the "cleanups." My recollection is (I have not the memoranda by me) that the saving in comparison with "oar samples" was raised from about 55 per cent to about 73 per cent.

I used habitually when milling under similar conditions (using water continuously) to make the pulp slightly alkaline by use of soda, with excellent results. The same use of an alkali was made during the experiments with the cyanide of mercury.

Lincoln, N. M.

Mining and the World's Fair.

EDITORS PRESS:—In speaking of the California World's Fair Commissioners in your issue of May 16th, the error is committed of stating that the mining industry had received no recognition in their appointment.

Mr. Robert McMurray from the 2d Congressional district is an old Nevada county miner for many years superintendent of the Enreka Lake Water and Mining Co., and now largest owner and manager of the famous Delbi gold-quartz mine.

Mr. John Daggett, of the 1st district, who commenced mining in El Dorado county in 1852, and has been constantly engaged in that industry since—spent two years in Nevada, superintending silver mines and mills, and three years in Calico, San Bernardino county—is now principal owner and manager of the Black Bear gold-quartz mine in Siskiyou county.

Mr. Irving M. Scott of San Francisco, although not a miner, is at the head of one of the largest manufacturing of mining machinery in the United States; and I can say for the balance of the commissioners, that they are fair-minded men of liberal views, and desire to see every interest and industry of California well represented at the Columbian Exposition.

MEMBER.

THE Plumas National says that the Shenandoah Mining Co. has just contracted for a ten-stamp mill upon its mine in French ravine, near Rio Bar.

The New Road Law.

In response to a quite general demand on the part of our readers for the new road law, we give the following transcript, prepared by the Santa Rosa Republican. The sections are amended as follows:

2641. The Boards of Supervisors of the several counties shall divide their respective counties into suitable road districts, and may change the boundaries thereof, and each supervisor shall be ex officio road commissioner of the several road districts in his supervisor district, and shall see that all contracts made with, and all orders of the Board of Supervisors pertaining to the roads and bridges in his district are properly executed; provided, when in any county the members of the Board of Supervisors thereof are not elected by districts, it shall be the duty of such Board, by proper order, to be entered in its records, to divide such county into supervisor districts, to correspond with the number of members of such Board, and assign to each member thereof one of such districts, of which he shall be such Road Commissioner.

2642. From and after Monday following the first day of January, A. D., eighteen hundred and ninety-three, the office of Road Overseer shall be abolished; provided, that whenever in this Code the words Road Overseer occur, they shall be taken and construed so as to read Road Commissioner.

2643. The Boards of Supervisors of the several counties of the State shall have general supervision over the roads within their respective counties. They must, by proper ordinance:

1. Cause to be surveyed, viewed, laid out, recorded, opened and worked such highways as are necessary to public convenience, as in this chapter provided.

2. Cause to be recorded as highways such roads as have become such by usage or abandonment to the public. Also, all such streets and roads as have been or may be declared such under section seventeen hundred and sixty-four of the Code of Civil Procedure.

3. Abolish or abandon such as are not necessary.

4. Contract, agree for, purchase, or otherwise acquire the right of way over private property for the use of public highways, and for that purpose institute or require the district attorney to institute proceedings under title seven, part three, of the Code of Civil Procedure, and to pay therefor from the district road fund of the particular district.

5. At the first regular meeting in January, eighteen hundred and ninety-three, and at any regular meeting thereafter, advertise for sealed bids for keeping in order, and repair all such roads, culverts and bridges in the county, as hereinafter provided; provided, that, the Board of Supervisors, in their discretion, may exclude from such contracts the repairing of any or all bridges.

6. In case no bids for contracts are received or accepted for work in any district, the Board shall order the work to be performed by the Road Commissioner of said district, as provided for in section twenty-six hundred and forty-five of this Code.

7. If any contractor neglects or fails to perform any work provided for in his contract, the road commissioner of the district in which such neglect or failure occurs shall notify such contractor to immediately make such repairs or do such work as is needed; and if the contractor does not use reasonable diligence in complying with such notice, the Road Commissioner shall cause such work to be done by others, and the cost of such work shall be deducted from the quarterly allowances of such contractor.

8. The Road Commissioner, in all the road districts in his supervisor district, shall inspect the work done under such contracts and orders and make a written report thereon to the Board in January, April, July and October of each year, which report shall include the amount and kind of work ordered done by him during the preceding quarter, under the provisions of subdivision seven of this section. The Board shall thereupon cause the amount found due the contractor for the preceding quarter, less such sums as the Road Commissioner may have necessarily spent by reason of the neglect of such road contractor, to be paid to such contractor, from the funds of the road district embraced in his contract.

9. The Board shall cause to be kept a book showing the number of sections in each district, their boundaries, length of roads in miles and fractions of miles, names of contractors, amounts of contract, and the cost of maintaining the several sections of road in each district.

10. Levy a property tax for road purposes.

11. In their discretion, cause to be erected and maintained, on the highways they may designate, mile stones or posts, or guide posts, and guide posts properly inscribed.

12. Cause the road-tax collected each year to be apportioned to the several road districts entitled thereto, and kept by the treasurer in separate funds.

13. Audit all claims on the fund of the respective road districts, when required to pay for improvement thereon.

14. In their discretion, they may provide for the establishment of gates on the public highways, in certain cases, to avoid the necessity of building road fences, and prescribe rules and regulations for closing the same, and pen-

alties for violating said rules; provided, that the expense for the erection and maintenance of such gates shall, in all cases, be borne by the party or parties for whose immediate benefit the same shall be ordered.

15. For the purpose of watering roads in any part of the county, the supervisors may erect, maintain waterworks, and for such purpose may purchase or lease real or personal property. The cost for such waterworks and the watering of said roads may be charged to the general county fund, the general road fund and the district fund of the district or districts benefited thereby.

2644. This section is hereby repealed.

2645. The Road Commissioner, under the direction and pursuant to the orders of the Board of Supervisors, must:

1. Take charge of the highways within their respective districts, and by and with the consent and approval of the Board of Supervisors shall employ all men, teams, watering carts and all help necessary to do the work in their respective districts, provided that no Road Commissioner shall be interested, directly or indirectly, in any contract or work to be done in the road districts under his charge and control.

2. Keep them clear from obstructions and in good repair, and destroy or cause to be destroyed, in the months of July and August of each year, all thistles, Mexican cockleburrs, or cockleburrs of any kind, and all noxious weeds growing or being on any portion of the public highways or public roads in their respective districts, provided that there be no contract to that effect.

3. Cause banks to be graded, bridges and causeways to be made, where necessary, keep the same in good repair and renew them when destroyed, provided that an emergency exists, or pending the awarding of any contracts.

4. Make quarterly reports, under oath, of the number of days they have been employed during the preceding three months, the number of days' labor performed on the roads and highways in their respective districts, by whom performed, and the wages paid per day; filing therewith a receipt or receipts, signed by each or all persons who have performed labor, stating the number of days' labor performed, and the amount received for the same; also the amount and value of the materials and the kind of each thereof.

5. When not otherwise provided for by the law, he shall receive for his services as such Road Commissioner, twenty cents per mile one way for all distances actually traveled by him in the performance of his duties; provided that he shall not in any one year receive more than three hundred dollars.

6. The Boards of Supervisors of each of the several counties may, if they deem it to the best interests of their respective counties, appoint one Road Inspector for each such county, and prescribe his duties and compensation, subject to the provisions of this act, provided that the compensation of such Road Inspector shall not exceed the sum allowed by law as the total compensation for the Road Commissioners of such county. In case such Road Inspector be appointed, no salary, fees or compensation shall thereafter be allowed to said Supervisors as Road Commissioners during the time that said Road Inspector is serving as such. The salary, fees or compensation of such Road Inspector shall be paid from the county road funds, and shall be as nearly as possible apportioned among and paid from the road district funds, according to the amount of service performed by him in the several road districts of the county.

Said Boards of Supervisors may delegate to said Road Inspector all powers conferred upon them by law as Road Commissioners, save that said Boards of Supervisors shall not delegate to said Road Inspector any power or authority to open bids, or award contracts, as provided in this Act, and no Road Inspector shall be directly or indirectly interested in any such contract.

2646. The Board of Supervisors must:

1. Advertise for sealed bids to maintain the roads in the several districts in the county, where contracts have not already been let, or for the reletting of contracts, by notice in a weekly paper published in the county, or in one published within the district in which the work is to be done, if there be one so published, and also post three notices in prominent places within said district, for four consecutive weeks immediately prior to the day set for receiving and opening said bids and awarding contracts.

2. The notice shall contain a general description of the roads in the district in which the work is required to be done under said contracts, the boundaries of the district, and explicit specifications as to the manner in which the work shall be done in particular parts or portions thereof.

3. The bids shall be made and contracts awarded for a term of not less than one nor more than four years. They shall be opened and the contracts awarded at any regular meeting.

4. Said contracts shall be awarded separately for each road district in the county and no contract shall be awarded to a person who is not a qualified elector of the county.

5. Contracts shall be awarded to the lowest responsible bidder, and a bond caused to be executed in a sum equal to the amount of the contract for the faithful performance of the conditions of said contract. The contractor shall also be required to perform the duties described in subdivisions two and three of section 2645 of this chapter.

6. The Board may reject all bids.

2652. The Board of Supervisors may, an-

usually, at any regular meeting held between the first days of January and March of each year, levy on each male person over 21 and under 55 years of age, found in each road district during the time set for the collection of said poll taxes for that year, excepting all persons who were honorably discharged from service in the army or navy of the United States, at any time within the first day of April, in the year of our Lord 1861, and the first day of September, in the year of our Lord 1865, an annual road poll tax not exceeding three dollars; and from every such person not above excepted, in a road district, who has not paid the same in some other district, must be collected the amount of road poll tax so levied.

Said road poll tax shall be collected by the County Assessor in the same manner that State poll taxes are collected, and all remedies given by law for the collection of State poll taxes, shall apply to and be in force for the collection of road poll taxes.

Road poll tax receipts in blank, signed and numbered in the same manner that other poll tax receipts are signed and numbered, shall be delivered by the Auditor of the county to the County Assessor on or before the first Monday of March of each year; and said Assessor shall be charged with the amount of such road poll tax receipts delivered to him, and he credited with those returned, and shall settle with the Auditor, and pay over the amounts collected, in the manner provided in section 3553 of this Code.

A sum not exceeding 35 per cent of all the road poll taxes so collected may be apportioned to the General Road Fund, and the balance shall be apportioned to the several districts of the county from which the same was collected.

Section 8. All Acts and parts of Acts in conflict with this Act are hereby repealed.

Section 9. This Act shall take effect and be in force from and after the Monday following the first day of January, in the year of our Lord 1893.

Opals.

At the last meeting of the California Academy of Sciences, the following paper was read by Melville Attwood, M. E.:

The precious, or noble, opal is one of the most beautiful gems in nature. When held between the eye and the light, it appears of a pale milky-reddish blue, but when seen by reflected light, it displays all the colors of the rainbow.

Opals are always cut *en cabochon*, on both sides, and the true beauties of the gem only display themselves when the stone is moved about, as then a fine opal really appears to have an actual life within itself.

Fine stones of a large size are rarely found; they seldom exceed an inch in diameter. When held in the hand to impart warmth to the gem, it is much more brilliant.

Some varieties of opal (the common) are found with silica and blends in metalliferous veins. They also occupy the interior of fossils in sandstone. Its formation is due to the solubility of amorphous silica in water, especially in hot water, or water containing carbonic acid, the silica being dissolved out by spring waters from decomposed silicates, and deposited under favorable circumstances in a state more or less approaching to purity.

At a former meeting I presented the Academy with opals in the matrix from the State of Washington. Since that I have sent another microscopic section of the Washington rock, which I now donate to the Academy. The section shows the rock to be basalt, consisting of a mixture of fine grains of labrador, feldspar, augite, etc., with a small quantity of magnetite iron.

Through the kindness of Adolph Sutro, Esq., I am now enabled to give the Academy specimens of opals in the matrix from Mexico, Australia and Hungary.

The inclosing rocks of those from Mexico and Australia are so altered, or decomposed, that I could not cut a satisfactory section from them. They are, however, without doubt, trachytes. The two specimens from Hungary are very interesting, being the same rock, but the one much altered or decomposed and the other fresh or unaltered. From the latter I managed to cut a section sufficiently thin to prove it to be a trachyte, with small crystals of leucite in it.

The result of my examination of the inclosed rocks of the different precious opal deposits, and from all the information I can obtain by papers written on the subject, is that the precious opals occur, or are found, mostly in dykes of intrusive volcanic rocks, and in those parts of the dyke near the surface, and where the rocks are greatly altered or decomposed.

MINERS OUT OF WORK.—A press dispatch from Helena, Montana, states that the last of the employees of the great Anaconda Mining Company have been discharged, even to the watchman, and the company mines at Butte and the mammoth smelter at Anaconda are shut up tight. More than 3000 men are thrown out of work. It was announced that the trouble was a dispute with the Montana railway over freight rates, and Marcellus Daly vouchsafed the information that work on a new line of railroad would begin at once, which may or may not mean that the works will not resume until the road is finished. Anaconda is a dead town and Butte is crowded with idle men, all because of the shut down.

To Sound the Pacific.

It has been definitely decided by the Navy Department to use the ship *Thetis* to survey the route for a cable to Hawaii. The soundings will be made from San Francisco to Honolulu. She will begin work just as soon as the appropriation for that purpose becomes available, which will be July first, and the work will be completed in two or three months. Lieutenant-Commander Glover, the hydrographer, says that since the *Tuscarora* took soundings 15 years ago, there has been considerable diversity of opinion as to the proper intervals between deep-sea soundings to ascertain the topography of the bottom of the ocean. After giving long and careful attention to this matter, Lieutenant-Commander Glover has devised a system by which soundings will be taken at intervals of one and two miles alternately, except when shoals are discovered, when soundings will be taken every quarter of a mile or even less if necessary. This plan will be employed by the *Thetis*. The *Tuscarora*, in 1875, found a shoal or submarine mountain in latitude 33 deg. north, longitude 132 deg. 30 min. west. At this point (near the California coast) a depth of 2282 fathoms ranged rapidly upward to 388 fathoms. The *Tuscarora* found that the greatest depth in the Pacific was along the coast of Japan, at some points there being a depth of more than five miles. A piano wire having a length of five miles was lowered, but failed to touch bottom.

Admiral Belknap, in an article in a Japan paper giving a description of his survey work, doubts whether a cable could be laid in such great depths. But a more feasible route might possibly have been found within 100 miles north or south of the point where this sounding was made.

Mr. Glover says that piano wire is admirably adapted for this work, and will be used by the *Thetis*. On the end of the wire will be an iron plummet, so arranged that the very moment it touches bottom it will become detached, and the relaxation of the wire's tension, however slight, is recorded on a delicate instrument on the ship's deck. An iron cup is also attached to the end of the wire, and this brings up a handful of sand, gravel, or whatever formation lies at the bottom.

Outlook on the Comstock.

The *Virginia Enterprise* says: Some people give up and "quesal" and some don't.

There is absolutely no cause for complaint at this end of the line. Many of us have engaged in the maelstrom of stock dabbling—sometimes called speculation—and we have emerged in vastly different conditions. Some came out untouched, some purified as if by fire, and many more came out badly battered, but still in the ring. But by this time we all should be pretty well trained to know how to take our medicine.

So far as stock gambling is concerned, it matters but little whether we guess them right or wrong. Those who guess them right don't invest among us. They go to Europe, or California, or the East and invest, and if they return after many years, it is a positive sign that they are broke.

So far as the business men of this community are concerned, they are all right. We will positively have a heavy season of work. Con. Cal. & Va. will extract from 2,400 to 2,800 tons of ore weekly until ice clogs the wheels of the river mills; the Nevada mill will run the year round; the Justice and Alta mills will have a long and steady run; the Occidental mill, we predict, will be started before long; the Yellow Jacket is experimenting on its gold bearing rock below the 1,200 level, and will ship about 100 tons of ore daily to the end of the season; the tailings mills on the Carson river are all at work. Savage and Overman will produce ore until next winter, and Hale & Norcross, Balcher and Crown Point will probably fall in line before the milling season is over.

So much work and activity means a fair business year, mattering not whether stocks go up or go down.

SHE RUNS THE MINE.—Mrs. Ed C. Loftus of Sonora, this State, has the distinction of following a line of business that few women know much about. She is a mining superintendent, and said to be a thoroughly competent one. She does not really follow the profession regularly, but only while her husband is absent attending to other business. The Golden Gate mine is said to yield \$168,000 net yearly. In referring to his wife's management, Mr. Loftus, who is stopping at the Occidental hotel, said: "Well, I must confess that she knows more in some respects than I do about mining, and I've had something like 20 years' experience in the business. It was my wife that advised me to take the property in the first place, even when it looked to be a risky venture, but I'm not sorry now I took her advice. She's just about as good a manager as myself, and if anything should happen to me, she could work that mine, and perhaps make more out of it than I can."—*Examiner*.

LATER developments in the Hirsch mine, Rens District, are even better than recently promised, and the outlook for the future is most encouraging. Regular carload shipments of rich ore are being made.—*Inyo Index*.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

NORTH STAR.—*Dispatch*, June 6: At the annual meeting of the stockholders of the North Star Co. held at Sutter Creek on the 3d inst, all of the difference between the company and the owners was adjusted and the mine will at once be reopened and work resumed. The old bond on the property had expired and the owners at first were not willing to give a new bond so favorable to the company, but finally agreed to. Both owners and stockholders have great confidence in the property and will start anew with renewed vim. The Comet is also to be prospected through the North Star.

SOUTH EUREKA.—*Amador Ledger*, June 6: The sinking operations at the South Eureka have reached a depth of about 30 feet. Nearly all the hoisting and other machinery purchased from the Ilex mine is on the ground. At the Hardenberg the mill is kept running steadily. No general cleanup has been made as yet, but the appearance of the plates gives every reason to hope for a paying output.

Calaveras.

PIONEER.—*Mt. Echo*, June 4: Work on the Pioneer mine, owned by Hallock & Co., is progressing rapidly. The shaft is now about 60 feet deep and the ore being taken out is of a very high grade. Mr. Hallock, the superintendent, is a mining man of great practical experience and a thorough metallurgist.

GRIDER.—Operations will soon be commenced on what was known in earlier days as the Grider mine, which is located on Smith's Flat. This mine was discovered more than 25 years ago by John Grider, but as he was not a man of means he failed to develop it to any great extent. The present parties have the money to work the mine and will no doubt succeed. There is not the slightest doubt as to the paying qualities of the mine if properly managed.

WEST POINT.—Away up in the quiet little burg of West Point things are very lively. The mines are running in full blast and turning out rich rock. Three or four loads of machinery passed through town on the way to the Lone Star (the Reed & Hillary mine). The quartz mills in this vicinity are kept busy crushing rock. Paddock & Morris had eight tons ground; the returns were about \$3000. The Barsley Bros. just had 18 tons ground. It turned out more than they expected. It is currently reported that a San Francisco company of large means will begin operations on the Brunner mine near Albany Flat in a few weeks.

El Dorado.

RUSSIAN DIGGINGS.—*El Dorado Republican*, June 6: S. A. Lane came down from Russian Diggings last Friday afternoon and went below on Saturday. Mr. Lane reports mining matters a little quiet in that direction at the present time. There seems to be some excitement about timber land which may be of value to Mr. Lane and his company, as they own 320 acres of mineral land most of which is covered with fine sugar pine and other valuable timber. They have their tunnel in 900 feet. Four hundred feet from the mouth of the tunnel they struck a rim channel of cement gravel three feet thick and 100 feet wide, all bearing gold. After passing through this first bed of gravel, the bedrock seems to pitch down several feet below the level of the tunnel. After running 400 feet farther through a white lava cap, Mr. Lane sunk several shafts in the bottom of the tunnel, finding at a depth of 13 feet a bed of quartz gravel three feet thick, containing \$2 per ton in gold. This, if properly opened, would pay very well to crush in a mill but there is evidently much richer gravel than that in the hill, as it is a well known fact that all the ravines breaking out of the hill have paid enormously during early days and have since been worked over and over many times, a great deal of gold being taken out. There can be no question but that the rich deposits in the ravines and flats making out of this hill were fed from it. Drifting on the gravel beds either way might soon develop richer gravel than has yet been found.

SAILOR JACK.—The centrifugal roller mill at the Sailor Jack mine was put in operation on the 21st of May and has been grinding 12 hours a day since that time. County Clerk Bosquit informs us that everything is working nicely and that the mill is a great success on the soft rock now being taken from the mine. A Woodbury concentrator is also in operation and has saved about a ton of sulphurets from the ore. Ten tons of quartz are being crushed every 12 hours.

KELSEY.—*Georgetown Gazette*, June 4: Kelsey mining interests are growing right along. The St. Lawrence will soon be connected with the electric dynamo which supplies power to the Dalmatia mine and worked on an extensive scale. The Lady Livingston mine has been started up.

Inyo.

HIRSH MINE.—*Inyo Index*, June 3: This property that for a number of years laid idle is now, under the new working, fast developing into a veritable bonanza. Returns have been received from a carload of ore recently shipped showing that the 10 tons worked \$1,347.99. The assay gives 73% per cent lead, 66.4 to ozs. silver and \$70 gold per ton. A second carload was shipped yesterday. The lode now shows 18 inches of solid lead. When work was resumed on the mine, about three months ago, the gold ore was on the foot-wall and the lead ore on the hanging wall. These conditions are now reversed, and both ores have increased in quantity and quality. Five tons of the gold ore will be worked in the local Maxim mill.

Nevada.

THE HARMONY.—*Transcript*, June 6: For about a month past each tenth load of gravel coming from the Harmony has been put aside with a view to practically determining as to whether the bulk of the gold in the dirt was being saved by the washing process alone. A large quantity of the gravel thus saved has been crushed at J. C. Locklin's mill and it yielded \$6.07 a ton, whereas only about two dollars a ton has been realized from washing alone. There are now several thousand tons of tailings at the mine, and it is believed that with a mill on the property the tailings can be crushed at a cost of not more

than 40 cents a ton. The gravel is of quartz formation, hence the necessity for crushing it. It is anticipated that the Co. will be out of debt by the end of this month. The stockholders are happy, which is quite natural under all the circumstances.

CALIFORNIA MINE.—*Grass Valley Union*, June 6: The developments making in the California mine are quite encouraging, as the quartz coming from both the north and south drifts on the bottom level (180 feet) is of good milling quality showing well in free gold and sulphurets. The ledge is somewhat broken up in the shaft and drifts, but it is evident it will be found regular and of good size by deeper sinking. Crushings will be made of the quartz from the lower drifts as soon as sufficient is taken out to make a good milling test.

THE MINNIE CO. WINS.—*Grass Valley Union*, June 4: The jury in the case of the Minnie Mining Co. vs. Tilley et al, which was on trial in Superior Court since the early part of last week, returned a verdict on Tuesday night in favor of plaintiff. The ground in contest, is situated on Cabin Flat, to the west of Gold Hill, in this district, and embraces about six acres of mining ground. The suit was brought to quiet title, as the defendants had made application for U. S. patent to the ground in dispute. The case is likely to be appealed to the Supreme Court.

THE NEW REDUCTION WORKS.—*Grass Valley Tidings*, June 4: The first "charge" was put through the Grass Valley reduction works at Union Hill this morning. It consisted of tailings and was put through merely to fill the interstices here and there in portions of the plant and to test the bearings, etc. The works will start up "for good" next Monday, and Manager Higginbottom informs us that he is assured there will be no lack of material to work upon. Seven tons of ore, concentrates, and sulphurets have been received for sampling purposes within the last few days.

GRAVEL MINING ON A SMALL SCALE.—*Grass Valley Tidings*, June 4: Down in Rough and Ready township a number of gravel miners are making big wages by the drifting process, working singly in some cases and by twos or threes in others. Two or three Portuguese are in particular doing well, although their knowledge of mining is evidently limited. One cut a gravel channel in a side hill lately, but instead of running a tunnel in on the channel and working the deposit systematically, he merely makes a cut into the hill, drifts out about 10 or 15 feet of the channel, and then repeats the operations. Notwithstanding the immense amount of dead work done, however, he makes it pay.

NEW SHAFT ALMOST COMPLETED.—The new 3-compartment shaft on the Peabody is down over 235 feet, and with 25 feet additional depth will cut the lowest level of the old workings. The shaft is a very large one and most substantially timbered. When the work of development is again fairly under way the Peabody will be frequently heard from, as the outlook in the old workings is all that a miner could desire. With a mill on the ground the Peabody will pay dividends right along.

A MILL CERTAIN.—We are informed by a member of the St. John M. Co. that arrangements for a 10-stamp mill to be placed on the property have passed the stage of negotiation and are all but consummated. The mill will be in operation before the snow flies. Of late, work in the mine has been confined to straightening the shaft and driving the west drift, in which the ledge continues to average five feet in width and the ore to improve.

RICH QUARTZ FROM THE CALIFORNIA.—Some very handsome and rich quartz was brought in from the California mine at Deadman's Flat on Tuesday. The ore came from the face of the north drift, which is now in about 20 feet from the shaft, and shows coarse gold freely. A small leaf of gold is also to be seen. The vein at this point is four inches wide and enlarging steadily. In view of the location of the mine we would not be surprised if a bunch of specimens is unearthed. In the south drift the ledge is a foot wide, the ore full of mineral and evidently of a good milling grade.

Plumas.

A BULLION PRODUCER.—*Oroville New Era*, June 3: Among the arrivals yesterday were Messrs. J. H. Frissel and A. J. Greeley, from La Porte. Both gentlemen are connected with the Union Consolidated mine, the former as a one-fourth owner, and superintendent. Another fourth is owned by W. S. Chapman, of S. F., and the remaining half by an English syndicate. The claim is located about five miles east of La Porte and is worked by drifting. About 100 men are on the pay roll, and the monthly expenses average in the vicinity of \$10,000. This large expense is met, however, by a monthly bullion output of about \$20,000.

SAVERCOOL.—*Greenville Bulletin*, June 3: Several days ago, Mr. Reed, of the Savercool mine, was up from below to inspect that property. It is rumored that steps will be taken immediately to put the mill in operation. However, considerable will be required to do this, as a plant for either steam, water or electrical power must be put in.

San Diego.

AN IMPORTANT SILVER STRIKE.—*Julian Sentinel*, June 4: No doubt it has been noticed that no mention of the new strike, of which the San Diego dailies made mention some time since, has not before appeared in these columns. The reason for this silence is easily explained. News of this nature should be given with a great deal of caution, and up to the present time there has been no definite information obtainable. The *Sentinel* is now in possession of information which is deemed reliable, having obtained it direct from the discoverer, Mr. Dan Higgins, more commonly called among the miners "Lucky Dan," from the remarkable luck that has followed his efforts in times past. Lucky Dan is an old silver prospector, and has discovered and sold mines enough, had he but taken care of his wealth, to have been numbered among the millionaires of the day. The new camp lies southeast of Julian some 50 miles, and is near the Dos Cabezas springs. A new district is to be formed and will be called the Higgins district. The formation is limestone and porphyry, and the belt extends from Mexican line some 30 miles northwest, and lies east and almost, if not quite, parallel with the gold belt. Its importance to the country cannot be estimated at this writing. A. J. Burnett, former owner of the High Peak mine in Julian, is associated with Mr. Higgins in the nine locations already made in the new camp, and we are indebted to him for the re-

sult of the assays made by W. S. Young, of San Diego, last week which are here given: Virginia per ton \$271.00; Charleston, \$278.32; Washington, \$68.88; Silver Hill, \$98.48; Silver Peak, \$74.00; San Diego, \$83.33; California, \$36.73. Quite a number of prospectors left Monday and Tuesday for the new field by way of Carrisero creek, that being deemed the nearest and best route. They are prepared to investigate and test the rock on the ground.

Siskiyou.

QUARTZ.—*Yreka Journal*, June 3: Active mining operations are carried on at the Schroeder & Werner quartz mines on the head of Deadwood creek south of Yreka with good success. The mill is kept running steadily day and night, and a large force of men are employed in both mill and mines, to supply the necessary force of day and night shifts. In addition to taking out a large amount of paying quartz, the other ledges owned by this company are being well prospected this season. A company has commenced work on a blue gravel claim about three miles this side of the Klamath river, near Ager, at the Richardson boys' old place, and find very rich prospects. This company is known as the Sacramento M. Co., and comprises G. A. Barr, formerly of the Black Jack, Calderwood and son, Gerber, Avery, and Pierson, of Sacramento.

GRAVEL.—Lee, Lab & Co. were obliged to suspend work last week, on account of the breakage of their wheel, but expect a new one from below this week to resume work again. They struck some very rich blue gravel when the breakage occurred, and will have a good supply of water for washing, provided parties on the creek above them do not use it all for irrigating purposes. The Yreka Blue Gravel Mining Co. will receive stock books in a few days to issue stock and commence work by sinking a shaft. The place for sinking has been selected somewhere near the divide at the Oberlin road crossing from Yreka creek to Shasta valley. Should good prospects be found, there will be a grand mining boom in Yreka basin, which is destined to make times lively in this city. Experienced miners who have been investigating this section, feel confident that rich diggings will certainly be found, and that an extensive ancient channel will be found running through Yreka basin down to the Klamath river. Considerable quartz is being taken out from the quartz mill at Long Gulch, a couple of miles north of Yreka, and the mill at that place under the management of H. B. Green, is kept busily engaged in crushing. Boyle & Co. are putting up a new stamp mill at the head of Humburg creek, to take the place of their grinding mill, which did not give good satisfaction. Old quartz miners think there is nothing equal to a good stamp mill. Dave McCook, of the mill at forks of Humburg, is assisting Boyle in superintending the work of putting up the new mill. Hegler & Aldrich, of Humburg creek, have struck a very rich body of ore in their mine and are now running their mill constantly in crushing the quartz taken out, expecting to realize a large amount of gold this summer.

The McConnell & Quinn mine at Klamath river is now being open for summer work under the management of A. Smith, an experienced river miner. He keeps a force of men working day and night, excepting Sunday nights, and is doing as well at night as in daytime by using their electric lamps which work well in supplying plenty of light. It will not be long before the bedrock in the channel is reached, when they will begin to take out pay gravel for sluicing.

Ventura.

OIL REGIONS.—*Ventura Free Press*, June 5: The development of the oil region is yet in its infancy in this county, and although the output is estimated at 30,000 barrels a month, it is safe to say that the supply will far exceed that amount in a year or two more. It means millions of dollars in wealth to this county. In the county clerk's office to-day, articles of incorporation of two new oil companies were filed, one called the Far West Oil Co., and the other the Rainbow Oil Co. Each one capitalized at \$50,000 and the incorporators are Lyman Stewart, W. L. Hardison, John Irwin, Alex. Waldie and T. R. Bard. The place of business is at Santa Paula.

NEVADA

Washoe District.

JUSTICE.—*Virginia Enterprise*, May 6: Shipped 147 tons of ore to the Washoe mill, worth \$22.50 a ton, as per battery assays.

SIERRA NEVADA.—630 level: West crosscut No. 1 from the northwest drift has been advanced 90 feet; total distance, 447 feet. There is no change to report in the formation.

OCCIDENTAL.—Extracted pay ore from the 350, 400 and 450 levels. North drift from No. 1 upraise, 500 level is in 114 feet, face in low-grade quartz. The upraise from the end of the south drift, 600 level, is up 30 feet; the top is in fair ore. The north drift from No. 2 winze, 650 level, has been connected with the south drift run from the bottom of No. 3 winze, and the circulation of air on that level is much improved. The south drift from No. 1 winze, 750 level, is in 108 feet; face in low-grade ore.

SCORPION.—The joint north drift from the 900 level of the Union shaft was advanced 26 feet, making its total distance 93 feet from the shaft. The face is in porphyry and clay.

ANDES.—East crosscut, 420 level, advanced 20 feet during the week; formation, clay and quartz. East crosscut from the south drift, 420 level, has been advanced to feet; formation, hard porphyry. The main south drift has been advanced 6 feet; face in vein porphyry.

BEST.—Have 55 tons of rich ore at the mill. The mine is opening out rich in an entirely new spot.

ALTA.—Are running the mill on tailings, of which there is a large quantity on hand.

YELLOW JACKET.—Shipping 40 tons daily of silver ore to the Santiago mill, worth about \$18 a ton, and 100 tons daily of gold ore to the Brunswick mill which is low grade.

OVERMAN.—Shipping on the average 100 tons daily to the Brunswick mill, ore worth about \$15 a ton. Are preparing to do important prospecting work in the mine.

SEG. BELCHER.—On the 600 level the west crosscut from the south lateral drift is 83 feet. It is still in soft porphyry.

CHALLENGE CON.—The joint Confidence and Challenge west crosscut on the 600 level is out 60 feet, 12 feet having been made during the week; the face shows quartz of no value. Joint Confidence and Challenge north drift on the 1100 level is in 293

feet, 20 feet having been made during the week; the face being in porphyry.

CROWN POINT.—The east crosscut from the south end of the 350 stope on the eighth floor has been advanced 26 feet during the week and is now out 58 feet. The face is in a mixture of porphyry and clay. The east crosscut on the 1000 level has been extended 26 feet since last report, and is now out a total distance of 156 feet. The face is in vein material composed of clay and quartz.

BELCHER.—The south drift from No. 2 crosscut on 200 level has been connected with No. 1 east crosscut. The north drift on 300 level is in a mixture of low-grade quartz and porphyry. The 1500 level east crosscut is in quartz assaying from \$75 to \$75 per ton.

CON. IMPERIAL.—We are still following up and taking out small streaks of ore on the upper levels and prospecting in and around the old stopes, where we find some fillings and hunches of ore of fair grade, which is being shipped to the Brunswick mill for reduction.

SAVAGE.—Milled 440 tons of ore of the average battery assay of \$17.53. We have haulion on hand amounting to \$27,767.60. The E-street tunnel has been repaired and advanced 60 feet since last report, making a total distance of 650 feet. On the 1400 level the east crosscut is in quartz and porphyry. Have started an east winze in north drift in quartz and porphyry. The west drift from the station on the Potosi level was advanced 24 feet; total, 73 feet. On the 750 level we are extracting rich ore.

HALE & NORCROSS.—On the 1400 level the winze from No. 3 east crosscut is down 135 feet, the bottom in porphyry. The joint winze in No. 5 east crosscut on our south boundary is down 25 feet. The bottom is in porphyry. On the 1500 level the north lateral drifts from the station was advanced 40 feet; total 50 feet. The face is in porphyry. The south lateral drift from the station was advanced 30 feet; total, 40 feet. Face in porphyry. Are constructing a double chute at the station on this level.

UTAH.—Incline winze has been sunk 35 feet; total depth, 130 feet, continuing in porphyry, clay and quartz of low assay value.

NEW YORK.—North lateral drift, 600 level, is in north of shaft 232 feet; face in porphyry. North lateral drift, 1100 level, is in 521 feet; face mostly in quartz yielding low assays.

SILVER HILL.—The southwest drift, 50 level, is out from shaft 80 feet; face in porphyry. South crosscut, 160 level, is out from winze 565 feet; face in hard porphyry.

CHOLLAR.—The south drift, 1400 level, from the north line, is out 137 feet; face in porphyry. The winze in the joint east crosscut, north line, 1400 level, is down 32 feet; the bottom is in porphyry. Extracted and sent to the mill the past week 524 tons of ore, the average battery assay of which was \$23.36 a ton.

POTOSI.—The winze is down 132 feet below the 1400 level; the bottom shows porphyry and streaks of quartz. The south lateral drift from the Chollar incline, 1100 level, is out 218 feet; face in porphyry.

WARD COMBINATION SHAFT.—The south drift from the 1800 station is out 60 feet; face in clay and porphyry.

EXCHEQUER.—The east crosscut on the north line, 600 level, is out 228 feet, face in clay and porphyry.

BULLION.—South lateral drift from the Potosi, 1300 level, is out 80 feet; face in clay and porphyry.

ALPHA.—West crosscut, 100 feet north of the shaft, is out 564 feet; face in hard porphyry.

UNION CON.—West drift from the shaft, 900 level, has been advanced 55 feet; total distance from shaft, 319 feet; face in clay and porphyry.

Cortez District.

PROSPECTING.—Battle Mountain Nevada, June 4: S. J. Jolin and Jack Houston have returned from a prospecting trip to Cortez district. They have prospected the mineral belt and find it to be about eight miles square, the center of the lode being Cortez. Outside these lines the country contains hardly a trace of good ledge formation. The examination of the district, lasting 20 days, has made a good impression on Sam Jolin, but the section is completely covered with claims. He purchased the Badger mine in Mill canyon, five miles north of the town and says there is ore enough in the croppings to more than cover the purchase price. A quarter of a mile above the Badger are the claims located by the Norrie diving rod, that at present a new departure in prospecting. Inside the stakes there are no signs of ore, but the rod indicates a large vein and on its merits the locators have recorded and purpose doing development work. In this canyon the Wenban mill stood before the change. Some of the claimants in the canyon are Ben Carter, a man named Texas, Gilham Bros., John Erving and Geo. Engstrom. The Badger contains a vein from one to three feet wide, carrying \$46 to \$342 in silver. As it is only 30 miles to the Central Pacific, over a level road, the property is a promising one. On their way in the parties made the drive to Galena in a day. They departed Tuesday to begin operations and the extraction of ore for shipment to Selby & Co., San Francisco.

Eureka District.

SMELTERS STARTED.—*Eureka Sentinel*, June 6: The Eureka Con. Co. started up their smelters last Wednesday. This will give employment to quite a number of idle men who have been patiently waiting for this event to occur.

Revelille District.

SATISFACTORY.—*Belmont Courier*, June 3: Arthur Delano recently hauled a load of silver ore from Revelille district, Nye county, to the Eureka reduction works, and we learn from Mr. Engbough that the result of the crushing proved very satisfactory to Mr. Delano. The net profits amounted to \$800. This shows that rich ore exists in that section of Nye county.

Rattlesnake District.

SILVER.—*Belmont Courier*, June 3: Charles Kanrohat is at present developing his silver mine in Rattlesnake district in Eastern Nye county. Joseph Engbough informs us that there is rich ore in sight, and he believes that Mr. Kanrohat will extract considerable good ore from this mine during the summer.

Indian Creek District.

PLACERS.—*Silver State*, June 4: Mr. J. B. Foltz, who is extensively interested in placer mining in Indian Creek District, came in yesterday, and after attending to some business in town, left for Verdi and Sacramento, to finish the purchase of

lumber and other supplies necessary for his camp. He stated that he had about half the material on the ground at present, and that he has ten men at work, in clearing the way, constructing and putting up the flumes which are to carry the water some two miles. Owing to the stormy weather he had been somewhat delayed, but he expected to be taking out dust now in a very short time.

Hawthorne District.

LAPANTA.—Walker Lake Bulletin, June 3: During the week the incline below the tunnel has been continued, showing a strong vein of high grade ore. The south drift from the incline has been extracted 16 feet showing the same character of ore all the way. An incline has been started from the northwest crosscut from the main tunnel, and is down 15 feet, the entire incline being in a body of iron assaying $7\frac{1}{2}$ gold, 20 ounces silver, with the exception of 10 inches on hanging wall which is $\frac{1}{2}$ gold ore. Stopping above main tunnel still continues, and a raise has been started above the north drift, 100-foot level of the shaft, showing 18 inches of $\frac{1}{2}$ gold ore.

PAMICO.—The lessees still continue to extract good ore from the stope above the north tunnel, the incline below the location tunnel, and the stope north of the long incline, and a new vein of very rich ore has been discovered on the surface between the location tunnel and the north tunnel.

CENTRAL.—Principal work this week has been sinking incline and stoping above 75-foot level. Two car-loads of gold ore shipped this week.

MOUNTAIN KING.—Main tunnel still being run ahead to cut the hanging wall vein.

HARTFORD.—An incline has been started on the vein near the location point, ledge about eight inches wide, half lead ore and half $\frac{1}{2}$ gold ore.

BEACON.—Stoping each way from the incline still continues.

CAPITAL.—Still drifting on the vein.

GOLD BAR.—Still drifting north from the bottom of the incline winze showing very well.

DICTATOR.—Still engaged in opening vein on the surface. Same is showing extremely well.

CONFIDENCE.—The ledge on the incline from northwest drift running flat, and has been followed 15 feet during the week. Same has now been stopped and prospecting is being done from the vein in the canyon west of the old works. Forty-five tons of ore being shipped this week.

FAIRMOUNT.—The main south drift has been extracted 16 feet, the total length of the drift being 100 feet on the vein. The last 50 feet having ore all the way. The grade of the ore has improved considerably during the week. Considerable 400 ounce ore is being extracted.

CHALLENGE.—Winze below tunnel is now down 16 feet. An eight inch vein on the foot-wall, a six inch vein on the hanging wall; the average value of the vein being about 60 ounces, with occasional bunches of 500 ounce ore in same. The main drift is being run ahead, showing a five inch vein in the face carrying some ore.

Tuscarora District.

NEVADA QUEEN.—Times-Review, June 5: South drift from Commonwealth 4th level has been advanced 12 feet in vein formation giving low assays.

DEL MONTE.—Joint west crosscut, 3d level, has been extended 25 feet; have a large amount of water. Joint raise from crosscut up 13 feet.

NAVAJO.—The stopes on the 350-foot level continue to produce their usual quantity of ore. The water has been materially increased by the prolonged heavy rains.

NORTH COMMONWEALTH.—Ore produced from stopes, 32 carloads first-class, assay, $\$20$ per ton; 62 carloads second-class.

COMMONWEALTH.—Stopes have produced 56 carloads of ore, assay $\$45$ per ton; total out, 130 carloads. 4th level: North drift from east crosscut advanced in the vein 12 feet; seam in the face of high-grade ore, picked sample assayed $\$98$ per ton. Crosscut in from north drift in 12 feet, average assays of three feet $\$14$ per ton. In raise from east crosscut have three seams of high-grade ore; assays show high percentage of gold.

BELLE ISLE.—North drift on the ore recently cut in the west crosscut from the 350-foot level is 18 feet; the face is showing a large vein of rich ore, full of ruby. South drift, same place, is in 23 feet; the vein continues strong and high grade; producing 11 cars of first-class and 28 cars of second-class ore. In both drifts the showing is very fine, the ore is clean and solid and has the proper pitch, with every indication of permanence.

NORTH BELLE ISLE.—North drift from Belle Isle 450-foot level extended 7 feet and crosscut started east 12 feet; rock very hard. No. 1 winze from same level extended 12 feet and suspended. No. 2 east crosscut from 400-foot level extended 18 feet; stringers of good ore are beginning to show in the face. The stopes above this level continue producing 95 cars of second and 6 cars of first-class ore. Have started crosscuts from the 600 station to cut the vein east and west of it.

ARIZONA.

COPPER.—Journal Miner, June 4: The United Verde Co. is turning out about two car loads of copper bullion and matte daily. It is being shipped to New Jersey to be refined. Over 70 car loads of ore and bullion have been shipped out this month over the Prescott & Arizona Central railroad. This goes to show that mining operations here are by no means on the wane.

SMEILER.—The Commercial Mining Co.'s Big Bug smelter has been started up, and a car load of bullion was shipped from there yesterday. Shipments are made by wagon to Verde Station on the Prescott & Arizona Central railroad and thence by rail.

KEYSTONE.—Charles Wallace is cleaning out and retrimbering the old shaft of the Keyhole mine, seven miles south of town in the Hassayampa district. This claim is one of the oldest in this section of the country, having been located in 1865 as the Benedict mine. A shaft was sunk to the depth of 66 feet on the claim, and remarkably rich ore was taken from it, some of which paid a profit for shipment even in those days of wagon freighting for hundreds of miles, the freight on a ton of ore, amounting to a small fortune in itself. Notwithstanding the richness of the ore, however, it would not bear shipment at a profit except as the ore was sorted out very carefully, and the claim was abandoned and remained idle until about three years ago when it was relocated, as the Keyhole

mine. Mr. Wallace coming into possession of it has placed men at work putting it in shape to be worked, and he is confident that he has a bonanza in it. His confidence is not a blind one by any means either, but is based on the former history of the property together with results obtained by exploring the ledge. Since commencing work he has had a shaft sunk 18 feet deep on the north end of the claim and has taken out galena ore, bearing silver which gives an assay value of $\$1,500$ per ton. As soon as the old shaft can be cleaned out and retrimbered he will commence taking out ore from it. The ledge can be traced distinctly for a mile on the surface of the ground.

SWISSHELM.—Tomahstone Prospector, June 5: C. F. Hine is in from the Swisshelm mountains and is feeling jubilant over the looks of the Swisshelm properties being worked by him. The main ledge has been struck and shows a strong four-foot of carbonate ore which will average 60 per cent lead, 50 ozs. silver and $\$20$ in gold. He says it is the biggest thing ever struck in Cochise county. He has two carloads out ready for shipment. But four men are at work upon the mine at present, and the ore taken out is simply what is necessary in development work. Charles is always over sanguine, but parties who have seen the property corroborate his account of it.

LEASED.—B. S. Coffman has leased a portion of the Bunker Hill property to George Goldworthy and others. He will also put a few men at development work. This departure from the custom of shutting down a property rather than lease it is a new one in Tombstone, and the result will be watched with interest. Mr. Coffman gives the chlorides the use of the hoisting works. The Comet makes regular shipments of manganese ore. The dry concentrating works at Bowie, it is said, are not successful, and other works will be put in.

COLORADO.

GOLD.—Denver Tribune-Republican, June 4: Probably the richest ore ever found in Colorado is that disclosed by the recent strike in the Cabinet-maker and Stenographer on White House mountain near Ouray in the San Juan. Unfortunately there is but a small narrow streak of it and it would take a long time to get a ton. Pieces of the ore have assayed as high as $\$200,000$ per ton in gold, and a small mill run of the rich pay streak gave $\$120,000$ per ton. It is a gold quartz and parts of it are so filled with free gold that a polished specimen on its face seems to indicate that the rock is at least 50 per cent of the precious metal. The mineral occurs in a fissure vein. Parallel with the gold streak is one of silver telluride, which carries 700 ounces of silver and three of gold, and the entire vein between walls gives a mill run of 13 ounces of gold and 25 of silver. The property is held under bond and lease by H. G. Sayles of Denver and Mark Atkins of Ouray. A syndicate of Denver capitalists was formed yesterday to buy a six-eighths interest in the property. It contains a number of leading real estate and mining men of the city, but their names will not yet be made public, nor will the price paid.

IDAHO.

STORMY HILL.—Idaho Avalanche, June 3: Drifting south from the shaft and putting in stulls for stoping, is being pushed on the Stormy Hill mine. A large amount of good ore is out ready for hauling to the mill as soon as the roads are repaired, which, we understand, will be done this week. The Black Jack mill will start up again, the pulp tanks having been reconstructed. Gravity tanks were placed in the mill when it was built, but owing to the character of the ore, had to be taken out and replaced by ones of different construction. The Flint mill will shut down Monday for the purpose of adding new machinery for increase of capacity. This will require four or five weeks' time, after which a force of miners will be put in the Rising Star mine belonging to the company. This mine has over 50,000 tons of good milling ore ready for stoping, with good ore in the face of every drift. The Poorman Co. increased its force of miners during the week, and it now looks as though the owners meant business. It is well known by every man who has been through this property that the mine is in shape to produce a large amount of good ore whenever the owners so willed. The old New York mill property has been attacked by a kind of decay which has within a short time left the old Chariot and Minnesota hoisting works nothing but holes in the ground. One by one the buildings around the old mill are tumbling down, and the lumber suddenly disappears. This property cost nearly $\$300,000$, but for 15 years it has belonged to a defunct corporation of which some stockholders still exist. There is no watch on the property and no sympathy for its owners wasted here; but the "decay" of the buildings is grand larceny all the same.

OREGON.

NEW SMELTER FOR MINERAL.—Bedrock Democrat, June 3: Messrs. George A. Fitch, of Tacoma, and C. C. Wing, owner of the Sommer & Wing mining property of Mineral City, are in town on their way to Portland for the purpose of purchasing machinery for the proposed new smelter to be erected and in operation at Mineral within the next sixty days. In case the necessary machinery cannot be purchased in Portland they will proceed on to San Francisco. We understand the mines of Mineral are developing into wonderful properties and it has become necessary to enlarge the present facilities for the reduction of the ores. The Porphyry Smelting Co. will, however, continue to operate and be supplied with all the ores its capacity will accommodate.

ARRASTRA.—Jacksonville Times, May 29: Provolet Bros. are preparing to put in an arrastra soon at their ledge in Murphy precinct. Selph & Taylor's arrastra is running at the March & Selph quartz ledge in Sam's valley, on excellent ore. The Patton mine near Talent has been running out some very promising ore lately, which has been hauled to Anderson's mill for reduction. Miners on Applegate are encouraged in their search for the precious metals by the sound of two steam whistles, one of them belonging to Bailey's steam arrastra, the other to Flannagan's quartz mill. Harry Lewis and Dr. Kremer of Grant's Pass have bought out Schrimp Bros.' interest in the North Star mine in Josephine

county, and will at once proceed to develop the property to the fullest capacity. Simon Messenger of Josephine county is succeeding nicely with his arrastra this season, but will put in a Huntington mill this fall in order to be able to handle the entire output of his mine with the least loss. The tested rock from the ledge located last week by Messrs. McCall and Porter, near Gold Hill, promises exceedingly well, and as the ledge seems to be almost without limit, big things may be looked for from that neighborhood. Mr. Porter has had many years' experience in mining in the Idaho diggings, and is of the opinion that the main ledge, of which the pockets heretofore discovered in the vicinity of Gold Hill are but spurs, has at last been found. The ore does not show anything fabulously rich, but the rock carries a great deal of gold.

LOWER CALIFORNIA.

MEXICAN GULCH.—Lower Californian, May 28: Mr. A. M. Kickert came in from Alamo last Monday on a business trip. He has been living in Mexican gulch, five miles this side of Alamo, for the past five or six months engaged in placering. In a conversation regarding the gulch, he said that the impression among mining men here and at Alamo that the placers in the gulch had been worked out was a great mistake. "I have been in the Alamo district ever since the excitement two years ago," said he, "and have done better in Mexican gulch than anywhere else in the vicinity. The placers there had been abandoned before they had been thoroughly worked, and for a long time the place was entirely deserted, but since my partner and I went in there a few months ago and got down to work there have been others follow our example, until there are at least a dozen men in the placers. All of them are doing well, apparently, though of course hard work is necessary in ground that has been gone over once. In a claim that was deserted by its former owner, and which we denounced about 10 days ago, we have already taken out three nuggets weighing 17, 46 and 45 pennyweights respectively, besides a fair quantity of finer gold. In my opinion Mexican gulch is not yet worked out. Regarding the Alamo mines, it seems to me that they are all right. Although the Indio has been shut down, the San David, near by, is said to be in good ore, and several of the other mines are prosperous. I look for a big strike to be made in the Alamo district some of these days, for it is plain that the mother lode has not been found yet. Where there is so much surface gold there must certainly be a big deposit near, and when it is found the camp will boom in earnest.

COPPER MINES.—Three hundred peons have been secured in Colima to work in the copper mines of the Boleo Co. in Lower California. For experienced miners the company offered from $\$1.25$ to $\$2$ per diem, and to men without knowledge of mining $\$1$ to a trifle more. In addition, the men with their families were given free transportation to the mines and were promised free houses there. Colima papers seem to anticipate that the men are not strong enough for the work.

MONTANA.

CASTLE DISTRICT.—Cor. Mining Journal, June 3: The Armada Co. has purchased and has enroute from Livingston a steam hoist which will be set up on the Armada lead. The company besides owning the Armada, which lies north of the Yellowstone, also owns the Smuggler, the Little V, located between the Yellowstone and Great Eastern, and the Sleeper, which joins the Cumberland on the east. The Hidden Hand Co. has let a contract to sink a new shaft 100 feet on the Dunderberg. In the old shaft a body of iron was encountered; the new shaft will be sunk further up the hill, and will be sunk to catch the same lead. On the road from Castle to Robinson there are several promising prospects, among which are the Gem, owned by Peters, Kertz, Phillips and Shaffer, upon which a 40-foot shaft has been sunk in a fine body of iron ore suitable for fluxing. The famous Hidden Treasure is next met. The shaft is 187 feet in depth. They have been hoisting with a whim, but as it was slow work the company concluded to put on a hoist. The company has let a contract to run a crosscut at the 100-foot level fifty feet, more or less, until the lead is struck at the bottom of the shaft, when connections between the two drifts will be made for air.

A STRIKE.—Montana Mining Journal, June 3: It is reported upon authority that a very rich strike of galena carrying sulphurets was made this week in one of C. Vaughan's locations in the Vaughan district, near the Peerless Jennie. An experienced miner who had seen the strike, remarked that Vaughan would yet wear as large diamonds as the Peerless Jennie people; it is to be hoped that he will be patriotic and wear Montana gems.

BARKER.—The grade to Barker from Monarch is quite completed and track laying will be commenced early in the month, and July 4th may mark the date when Barker's commercial isolation shall end.

BELL BOY.—Another car of ore is on the way from the Bell Boy, in Tousey Gulch, above Marysville. Shipments from this mine are occurring with pleasing regularity, and the net returns are as fully satisfactory.

THE LION.—The Lion Co. has purchased and will have in operation this week, on the mine in Deer Lodge Co., air compressors to work the drills. Work on the 300-foot level in the south vein has drained the 200-foot level of the north, proving some connection between the two veins, possibly a union.

PLACER MINING.—Another copious rain keeps alive the joy in the hearts of the placer miners. From all points come reports of work being pushed to the utmost capacity, day and night work being carried on wherever there is sufficient water. Montana will certainly not be behind any State in the production of placer gold this season.

NEW MEXICO.

DIFFERENT DISTRICTS.—Pinos Altos, June 5: Pete Wagner started up his mill yesterday afternoon on ore from John McDonald's mine. Bell & Stephens' mill has closed down for a few days. This was rendered necessary on account of lack of teams to haul ore. A gentleman in from Carlisle informed the Pinos Altos that that camp is almost deserted, though a few claims are being worked. James Tong, Mr. Cook and I. Goldsmith are taking out

ore from the Alhambra mine, formerly the Jumbo, at Carlisle, which runs away up in the hundreds. The contractors are at work putting in the framework for the stamps in the Mammoth mill and will put in the irons as soon as they arrive, which are expected every day. J. Kindell and J. D. Lee report Cooney, although not being on any particular boom at present, a good steady camp, and have undoubted confidence in its future greatness. On the Kleptomania they are drifting both ways on the 350-foot level. A rich body of ore was encountered at the end of the crosscut in the drift, a test run of which is now being made at the Aztec mill. At present there are 25 men at work on this mine. N. H. McCustian is taking out a goodly amount of ore from the Geronimo mine at Carlisle which runs over $\$500$ to the ton, and had a carload ready for shipment last week. The Birthday mine, the happy possessor of which is Mr. J. N. Whitaker, has a 6-inch vein which runs over $\$17$ per ton in gold on the plates. The shaft is down 50 feet and the ore body is widening out as depth is attained. There are three men at work on the Ribbon mine, owned by H. M. Stanley, hoisting out water preparatory to sinking. The Ribbon adjoins the Mountain View, and in the past some very rich ore has been taken out of it. Pacific No. 1, is working 40 men and taking out a ton of ore to a man per day. This mine never looked better than at this writing. Supt. John Spiller says the Pacific mill is at present dropping 15 stamps, but would, he thought, in a short time be running at its full capacity of 30 stamps. The mill is, with 15 stamps, putting through about 35 tons every 24 hours. The Harvey Bros. and Holman are working on their Homestake mine. The shaft is down between 40 and 50 feet with a 12-inch pay streak. Tuesday they struck a body of ore which for beauty, variety of metals and indicated richness is second to none in this section. It is full of native copper, as well as silver, and carries sulphide of silver, gold, iron and lead.

SOUTH DAKOTA.

GRIZZLY GULCH.—Deadwood Pioneer, June 4: Some day Grizzly Gulch will develop a number of gold producing mines that will rival the Homestake and kindred properties. It has several quartz lodes of known value, and recently Joe Stahlcup discovered some rich placers yielding coarse gold as high as $\$9$ per ounce. He has 20 acres of placer ground in the gulch, and has frequently found spots which yielded 500 to the pan. Last week he worked three days on one of these patches and with only pick and shovel cleaned up $\$14.50$. Above these places are some good quartz mines that only require capital to open up and build mills. The gulch is only three and one-half miles from Deadwood.

RICHMOND.—Deadwood Pioneer, June 3: The Richmond mill was all ready to start up, when Supt. Havens determined not to start it up, but to put in a plant for oxidization similar to that described heretofore in the Pioneer, and one of which is now in course of construction at the Montana mill. The process is to roast the ores by means of petroleum, and then to oxidize the metals by the application of sprays of water. Mr. Havens is confident that the process will succeed, and if it does, it will materially decrease the price of working refractory ores.

SQUAW CREEK.—A party of Galena miners will leave to-morrow for the new silver camp on Squaw creek. A gentleman who recently came up from there says that the mineral is all found in the slate, and that the only discovery of any importance is that of Judd the original discoverer. He says that the discovery was made in a draw, and nobody but a farmer could have found it, as there were no outcroppings or signs of mineral anywhere.

WASHINGTON.

MORE KITTITAS GOLD.—Edinburgh Capital, June 4: Torkel Tweet came down from the Swauk last Monday, bringing with him the result of three days' work with a hand-mortal, in the shape of gold amalgam, weighing 59 ounces and valued at $\$960$. This strike was made near the Pike claim, and when found had the appearance of a fissure vein. It was panned out of decomposed quartz, a very limited supply of water being available. This latest product of the Swauk fields was greatly admired and it was generally conceded to be a remarkable production, and many were firmly convinced that the mother lode had at last been found. The piece was placed on exhibition in Rehmkne's window prior to shipment to the San Francisco Mint. Although this is a remarkable find for any country, it is doubtful whether it or the reports of it will attract the least attention until it gets to the Mint, where its value will be appreciated. It is very strange that after so many years of successful prospecting, so few men should be in the camp and so little interest should be manifested in it both in the State and outside. However, it will not take many strikes like this to open the eyes of the people to the fact that this is a gold-producing region.

THE PAULSON.—Ruby Miner, June 3: Another shift has been added to the force on the Paulson on Ruby hill, which is being operated on a working bond by Hansen & Dice of Spokane. The tunnel is now in 100 feet. These gentlemen express great satisfaction with the outlook and by the time the bond expires expect to have the mine looking like a good buy.

A NEW VEIN.—Bob Hargrove says that in running the tunnel to tap the Lake View ledge another vein has been encountered, upon which he is now running. The new ledge is six feet wide and carries good ore. He thinks it is the Hardscrabble lead.

FIRST THOUGHT.—In the First Thought mine a crew has been put to work sinking a winze from tunnel No. 2 to connect with No. 3. The contract to drive 700 feet on No. 3 should have been finished by June 1st, but hard rock and an excessive flow of water will delay its completion for probably 30 days. A portion of the regular force in the mine was detailed last week to thoroughly timber tunnel No. 4, preparatory to driving through to the 3000-foot station. Ore shipments continue regularly, the last wagon train taking out three tons of high-grade sorted ore.

RAINBOW.—The force heretofore working on the Coyote has been shifted to the Rainbow, both mines adjoining and being under the same management. The last-comer reports that the Rainbow tunnel is now running in first-class gold rock.

MECHANICAL PROGRESS

Forging by Electricity.

A New and Important Process.

A committee consisting of several gentlemen—prominent members of the Franklin Institute of Philadelphia—were recently invited to visit Boston for the purpose of witnessing a new and important application of electricity for forging iron. The reader will hear in mind that the welding of iron by electricity has already become a matter of very general and most successful practice; but the present writing is descriptive of forging iron by the same agency, and is quite new and equally important.

This forging plant is the property of the Electrical Forging Co., Boston. The exhibition to which we refer took place on the 13th ultimo. The plant consists of a 60-horse electric motor. The current, which is alternating may be used at a very low voltage, or increased up to 12,000 amperes. The heating apparatus consists of a number of clamps, with electrodes of peculiar design and construction which hold the metal to be heated; there are also numerous dies, presses, rolling machines, etc.

The Heating Apparatus

Is capable of giving a correct proportionate to the work in hand and is completely under control of the operator. The exhibition is described by the *Boston Journal of Commerce* as follows:

A bar of wrought iron inserted in the jaws of the machine was in a few seconds at a white heat, and finally melted, dropping to the floor a liquid mass. Another piece of steel was heated, one end fastened in a vise and twisted in close spirals throughout its entire length, at one heat. Other pieces, wound about a mandrel, formed a spiral spring at a single heat. A $\frac{3}{4}$ inch rod of steel was heated in a few seconds, heated into a knife blade, ground and inserted in a handle within a short time. A square bar of $\frac{3}{4}$ -inch iron was heated evenly throughout its length and worked into different shapes on the anvil and straightened again at a single heat. Many other interesting tests were made, all showing the rapidity with which the iron and steel can be heated by electricity and heated evenly within any limits desired.

The methods used being comparatively in the earliest stage of development, were necessarily crude, so that the exhibition was of value more particularly because of the possibilities it opened up. Forging of every description may be done, from that ordinarily given to the blacksmith, to work now done at the expenditure of considerable labor and time in specially prepared machines. Its capacity is limited only by the number of dies that can be made for the different articles it is intended to produce.

The Superiority of the Method

Lies in the evenness with which the whole mass is heated. The blacksmith now heats the outside of his metal to a white heat while the inside is comparatively cool. Under these conditions the outside rapidly gives off its heat and the work must again be placed in the forge to be reheated for further working. Then the metal is unevenly heated throughout, and when rolled or pressed into various shapes is entirely unreliable because of the unequal internal strains to which it is subjected by the unequal contraction of the article in cooling.

In the electric method the passage of slow alternating currents heats the interior of the iron first. This even temperature is particularly valuable in the tempering of fine tools and is absolutely necessary. It then becomes a matter of certainty instead of dependence upon the skill and judgment of a single man, probably, in a whole factory. The heating of the metal is so instantaneous that it is only in the path of the current and the projecting ends are barely warm.

It looked little short of marvelous to see a workman hammering a bar of iron a foot long held in his bare hands, while six inches of the other end was red hot. This merely indicates how readily any desired portion can be heated without affecting the rest, simply because it has not time to conduct the heat, and also showing how free the process is from all those disagreeable things that are inseparable from the present blacksmith's forge or rolling mill.

The freedom of the metal from all gases is another advantage, as it can be readily understood that when a piece is heated by a current of electricity no gases are developed; moreover, the metal, whether it be iron, steel, brass or composition, after having been heated by this process, is without scale, which is not possible under any other method. The question may suggest itself as to

The Difference Between This and the Method of Heating for Electric Welding.

They are essentially different. In the well known welding process the two pieces are brought end to end like the opposite poles of an arc lamp, the imperfect contact of the two pieces concentrating the current at the point of greatest resistance, and heating that point at once to the greatest extent. As the ends are pressed together new paths for the electricity are found until the whole of both ends are heated and forced together until welded. In the method for forging, however, the contact is as perfect as possible and heats the metal by the passage of the electricity through the metal to be heated. The process is the invention of George D. Barton of Boston.

Improved Armor Plates.

The efforts at improvement in armor plates for war vessels seems to be meeting with most unexpected success. The chief point heretofore sought for has been to avoid perforation by impact by increasing the resistance of the armor to penetration with very little thought in regard to the effect which such resistance might have upon the projectile.

An interesting test of armor has recently been made at Annapolis of plate manufactured upon quite a new system, and with special reference to the destruction of the projectile at the instant of impact. The system is founded on the homogeneous steel of Schneider, and adopting the admitted improvement of the nickel alloy, but using a new process of manufacture devised by Mr. H. A. Harvey of New York. The new system is described in the *Scientific American* as follows:

This process is that of decarbonizing the surface of the steel plate so as to give it a very high temper and extreme hardness, with a view to breaking up even the best projectiles. Taking a homogeneous plate of mild steel throughout, or of steel with nickel alloy, the front surface is treated by this process, with a gradual diminution of it in the interior, while the back of the plate remains untouched. The object is not continuing the hardening process throughout is to retain the toughness and tenacity of the mild steel at the back, so that if the projectile should break up the front, the tendency to crack all the way through will be avoided.

The Harvey plate in the present trials was manufactured by Carnegie, Phipps & Co. of Pittsburgh. In a preliminary test of the Harvey process, made last February, a plate 10 $\frac{1}{2}$ inches thick was fired at by a six-inch gun. Six rounds were fired, half with Holtz and half with Carpenter or Firming projectiles. The Harvey plate was very severely cracked by the end of the trial, but the naval authorities had grounds to believe that for a single shot a plate made under this process might resist better than any other ever manufactured. In fact, this armor had shattered two of the Carpenter shells, which had penetrated less than half way, and one of the Holtz, which did not get quite through. It was accordingly determined to try several other Harvey plates, to be made for experimental purposes by the Pittsburgh firm.

In order to test thoroughly, not only the intrinsic strength of the Harvey plate, but its relative efficiency, it was further determined to try no fewer than five plates, two of which should be of homogeneous steel, one of steel with a nickel alloy, and two of the nickel steel manufactured by the decarbonizing Harvey process, all made at the Pittsburgh works, and each eight feet long by six feet wide, but with a thickness of only three inches. This latter represents the protective decks and shields of some of our war vessels, and is sufficient for illustrating the comparative merits of the systems of manufacture. Of course, they could not be attacked by heavy guns, and a six-pounder Hotchkiss rapid-fire gun was substituted. The plates were arranged at a distance of about 12 yards from the gun, and 20 rounds were fired against each plate. The result was the complete destruction of the two steel plates and the penetration of the nickel steel as far as the oak hacking, which was entered and injured. But the Harvey plates kept out the projectiles from the oak hacking, and though they showed some cracks, they completely broke up the projectiles and gained a great triumph.

Taken together with the February test of a thicker Harvey plate, this trial makes it clear that still another advance has been made by our naval ordnance bureau in the method of manufacturing armor. It has also practically confirmed the conclusions reached last September, and in subsequent tests that an alloy of nickel yields better results than steel without the alloy.

A CIRCULAR SAW THAT PLANES.—Says a Glasgow, Scotland, journal of late date: "One of the simplest, although perhaps the most interesting exhibits in the mechanical section of the Glasgow Industrial Exhibition is a circular planing saw, exhibited by the Planing Saw Company, Limited, Nottingham, which cuts and planes all kinds of wood by the same action as an ordinary circular saw, producing a beautiful smooth surface, equal to hand planing, with little additional power and no more labor than is required for ordinary sawing. The invention is applicable to all kinds of circular sawing, and has already been adopted by some of the principal railway companies in their carriage and wagon hulling departments with the best results in the saving of labor and expense. There is no planing required, which should be invaluable to pattern-makers, cabinet-makers, packing-case makers, carriage and wagon builders, agricultural implement makers and all workers of wood generally."

BLOCKING SAWS.—Most mechanics who for the first time visit a shop where large circular saws are made, are much interested in the process known as "blocking" saws. This is the process by which they are straightened and the proper tension imparted to them, and is an operation requiring the exercise of exceptional skill and judgment as well as a great deal of experience.

IRON RUSTS more readily when subjected to alternations of hot and cold. When kept at about the temperature of boiling water it corrodes more rapidly than at any other degree of heat.

SCIENTIFIC PROGRESS.

The Mystery of the Ear.

"The human ear," said a scientist to a Washington *Star* reporter, "is an organ, the true inwardness of which the physicians have never been able to get at. They can examine the interior of the eye with ease by throwing into its dark chamber a ray of light reflected from a little mirror, and of late they have found it possible even to see the gray matter of the brain by looking through the little canal by which the optic nerve enters. The cavity behind the nose they inspect with the aid of a light placed far back in the mouth."

"They have no difficulty in seeing into the stomach by an electric apparatus; the intestines likewise are readily enough investigated and the bladder also. But the ear, as to its internal arrangements, is unapproachable. It is even impossible to dissect it satisfactorily after death, for the reason that the parts collapse at once when the vital spark leaves the body. The drum, in a living person, has the way to observation, and even though it be pierced, the winding passages beyond can not be seen through. On the other side of the drum are the three little bones—the mallet, the anvil and the stirrup—which act upon each other as levers. The drum acts as a sort of buffer, and the mallet, immediately in contact with it, conveys the sound waves through the anvil and the stirrup to the 'cochlea,' a spiral, shell-shaped chamber just behind and above the external opening of the ear."

"This shell is composed of filaments of the auditory nerve, coiled spirally, and each one erect and waving tremulously in response to the slightest waves of sound. They carry the sound impressions directly to the brain, and so delicate is their sensitiveness that the hearer perceives not only the degree of loudness, but even the finest quality of a sound, the harmony of tones, and the distance from which it comes. The moment that life becomes extinct, however, the spiral shell of nerves collapses and the marvelous organ is a dead thing, unsatisfactory to the investigating anatomist. If only it had been found possible to examine the internal structure of the living ear, aural surgery might perhaps amount to something to-day."

Artificially Colored Flowers.

At the last meeting of the California State Floral Society, Mr. Emory E. Smith read the following, which is replete with interest to all lovers of flowers:

Every now and then some one starts a story of having seen flowers of unusual colors, such as blue roses, red calla lilies, green violets, etc. These seeming freaks are always a seven days' wonder to those who are not familiar with the method by which they are obtained. For many years it has been a well-known fact that flowers when dipped in certain chemicals would rapidly change colors to such a degree as to be almost unrecognizable as the same variety. The public in general has known but little of the methods employed. M. Fipol, a distinguished savant, recently exhibited to the Scientific Association in Paris the results obtained by subjecting flowers to the influence of a mixture of sulphuric ether and ammonia. A quantity of ether is poured into a glass and to this is added a small quantity of liquid ammonia, say one-tenth of the volume.

The flowers are then plunged into the fluid and with the most surprising results. Those which are naturally red or violet in color, take upon themselves a bright green tint. Flowers, the colors of which are variegated, assume as many different shades; for instance, the upper petal of the sweet pea would become dark blue, while the lower petals would turn a bright green. White flowers usually assume a yellow color. Red geraniums turn blue, and red snapdragons become brown. Yellow is seemingly the only color which the solution does not affect. The action of the liquid is very rapid, and colored spots can be procured upon the flowers by pouring here and there a drop of the solution. Flowers which are many colored are sometimes changed to the most remarkable novelties that it would be possible to imagine. After the flowers have been subjected to the liquid, they should be plunged in pure water, when they will retain their new tints for several hours, but will gradually assume their natural colors.

CONTROLLING SEX.—In considering the causes which determine sex in animals, we are irresistibly led to include the fact that the sole difference between a queen bee and a neuter gender worker bee, is that to produce the first, the egg is given a larger cell, and the larva is fed upon a higher grade of food. There is no doubt of this fact, and so we may use it as an illustration of one of nature's methods, and as a hint to utilize the knowledge so gained. If extra care, extra food is required in one branch of creation, why may it not be also as powerful an agent in any other. Let cattle breeders who especially desire heifer calves proceed on this plan. Keep the mother cow in perfect health previous to copulation, give her the best care, the best quarters, the most nutritious food, and treat her as if she was really to produce a queen of the dairy. This process can do no possible harm, will insure a perfect calf, and if it should result in bringing a heifer in seven cases out of ten, there will be fewer

bull calves of but little value, and more heifers, which are of the most value for dairy purposes. We commend this to breeders as a judicious course in every case whether the producer is male or female.

Telescope and Microscope Lenses.

R. B. Tolles of Boston, according to the *St. Louis Globe-Democrat*, was the most successful maker of microscope lenses the world has ever seen. He recently died, but while living, occupied the same relation to his business, as maker of microscope lenses, as does his neighbor, Alvan Clarke of Cambridge, to his business of making telescope object-glasses.

Mr. Tolles, some years ago, produced a microscope lens which magnified 7500 times. It was the first and only one ever constructed, and was made as the result of a long controversy with other microscopists in regard to the possibility of resolving what was known as Nohet's nineteenth hand.

Nohet was a Frenchman, who, by mechanical appliances, ruled on glass parallel lines at the rate of about 100,000 to the inch. No microscope lens then made was sufficiently powerful to count these lines. Mr. Tolles started to make an objective that should magnify 7500 times. This he succeeded in doing about 1874. This objective was one seventy-fifth of an inch in diameter, and is about as large as the hole made in a sheet of paper by the point of a very fine needle. This lens was afterward sold for \$600 to Major Woodward, in the Government employ at Washington. He sold it to Dr. Ephraim Cutter, in whose possession it now is.

Objectives that magnify 5000 times are rare, and it is a "powerful microscope" that magnifies even 2500 times. These are necessary in bacteriological research, and in testing blood corpuscles to determine whether they are of human blood or not. A local paper recently told of a Boston Physician who examined the tubercle bacillus with a glass that magnified 900 times. Ridiculous! You can't see the consumption bacillus with an objective that magnifies less than 1200 times. England is the great rival of this country in microscope making.

If an object-glass is ever made that will magnify 10,000 times, it will be a more difficult task than making a telescope glass twice the size of the great glass in the Lick telescope.

THE REACH AND SCOPE OF INTELLECT.

Every man is fitted to fill some position of importance. Every man's mind is more or less expansive, more or less reaching, more or less comprehensive. The man who loves his profession always possesses an inquiring mind; he is judiciously inquisitive; he guides his inquisitiveness in the line of his profession; he is a learner and a teacher. If he becomes a mark among men, the mark is always in proportion to his success. If he confines his investigations to a scientific line, he discovers and applies the truths which govern his operations. This makes him a successful man; if a farmer, he is ready for all emergencies, he succeeds because he understands nature's laws and her demands. His crops are always fair, almost always good, generally superior, and he flourishes like a green hay tree.

A CURIOUS PHENOMENON IN ELASTICITY.

If a strip of gum rubber be heated, then expanded, and quickly wound round and round upon a metal tube or wire, and then cooled for a short time in cooling mixture, it immediately loses all of its elasticity and has no tendency to contract. If, however, it is then put into hot water, it at once regains its elasticity and returns to its original length. Another way of observing this same phenomenon, is to hold the heated rubber a second in an expanded condition when unvulcanized, when it will retain its shape. If, however, it is now immersed in hot water, it contracts to one-fourth or one-fifth of this length, and will remain contracted to one-third or one-fourth of its original length. These are what may be called the secondary effects of elasticity.

TELEPHONING ACROSS THE ATLANTIC.

Experiments are now being made to ascertain if it is possible to communicate with America by telephone. Of course the ordinary telegraphic cables are being used, but it will, no doubt, be necessary to lay a special cable for this purpose when it has been demonstrated clearly enough that conversation can be carried on from such a distance. We understand that sound can be heard the other end, with the apparatus now in use, but as in telegraphy, so in telephony, a specially delicate form of instrument will have to be designed before perfect success will be obtained. The telephone in London was recently connected through to Marseilles, and conversation was carried on with great success.

WHY THE EAGLE CAN LOOK STEADILY AT THE SUN.

The eagle is enabled to look at the sun by reason of a thin, semi-transparent veil, which can be instantaneously drawn over the front of the eyes. It is known as the nictitating (i. e., winking) membrane, and acts as a screen to shut out the too great intensity of light, so that with its assistance the eagle can confront the sun even at noonday. The membrane is so fine as not to obstruct the sight when drawn, like a curtain, across the pupil, and when not in use lies folded up in the inner corner of the eye.

GOOD HEALTH.

IDIOTS.—An interesting experiment was made recently at the great idiot asylum of Parle. A kind of Punch and Judy show was exhibited before the inmates, with a view to ascertain whether any impression could be made by it upon their dormant intelligence: "About 1100 idiots were assembled in the gymnasium of the institution, most of whom had made some slight progress toward intelligence. Many of them had learned to tie their own shoes; others could dress themselves, with a little assistance; others could feed themselves pretty well; all had learned to sit still, and most of them could imitate the easier motions of their instructors. When they were seated and in order, the curtain rose, disclosing a small stage. The play presented was called 'A Dentist's Pupil,' and the fun of the piece was chiefly due to the vigor with which the hero plied his endgel. At first the physicians were inclined to believe that the experiment was going to be successful. The unfortunates applauded the endgellings in their uncouth way, making loud ontories and laughing holsterosely. It seemed that there was but one perfect idiot in the whole assembly—a dwarf, with a huge, mishapen head, who had been exhibited at fairs under the name of the 'King of the Esklmos.' He alone remained quite passive during the whole play. When the performance was over, the company relapsed at once into their nasal silence and vacancy. There was no exchange of impression, no after-glow of interest, and, what was more discouraging, they appeared to have no recollection of what had occurred. The conductors of the experiment were obliged to conclude that the play had had no effect in rousing or stimulating intelligence."

Too MUCH SHADE.—Houses in places otherwise unexceptionable are often so closely overhung with trees as to be in a state of humidity by the prevention of a free circulation of air and a free admission of the sun's rays. Trees growing against the walls of houses, and shrubs in confined places near dwellings are injurious also as favoring humidity. At the proper distance, on the other hand, trees are favorable to health. On this principle, says Dr. James Clark, it may be understood how the inhabitants of one house suffer from rheumatism, headache, dyspepsia, nervous affections and other consequences of living in a confined, humid atmosphere, while their nearest neighbors, whose houses are otherwise situated, enjoy good health; and even how one side of a large building fully exposed to the sun and a free circulation of air may be healthy, while the other side, overlooking shaded courts or gardens, is unhealthy. Humid, confined situations subject to great alternations of temperature between day and night, engender the most dangerous of all the physical qualities of the air, and humidity in general is the most injurious to human life. Dryness, with a free circulation of air and a full exposure to the sun, are the material things to be attended to in choosing a residence.

CITIES DETRIMENTAL TO EYESIGHT.—That "we are all poor critters," as the Widow Baddott quoted her late husband's saying, is but too well proved by noting the percentage of thin, scrawny, pale and otherwise defective people in any crowd; but of late the doctors have presented appalling proofs that city-bred people are unusually "poor critters." Their greatest defect is in the eyes. One-third of all the city people are more or less near-sighted. The tall buildings limit their range of vision, the invisible dust, even more than the visible, injures the eye, and the wearied organ is not restored by gazing over the green fields and far away. The narrow walls of the home or playground or schoolroom shut the children in during their growing years, and the eye, habituated to so short a range, loses half its capacity. The truth of this is proved, and more's the pity.

THE CHIN IN WALKING.—Much care and thought should be exercised in walking. The shoulders should be kept up and square; the chest should be expanded. The chin is the pivot upon which largely depends the poise of the machine. Step out easily and firmly, letting the ball of the foot strike the ground first, so that you get the benefit of that beneficent little spring which Dame Nature has built into your instep to save the rattle and jar to the whole system, which people who will walk on their heels inflict on their anatomy.

GIRLS WITH THEIR SCHOOL BOOKS.—The habit of young girls carrying their school-books under their arms, or in bags or portfolios hung from their arms, is said to be to distort the figure. German doctors are exhorting parents to provide young girls between the ages of 11 and 14 with knapsacks for carrying their school-books.

THE BLOOD IN PNEUMONIA.—Dr. Kikodze, a specialist, has been devoting his attention to the condition of blood in the human body during pneumonia, and found that during the course of this disease, the white corpuscles increase in number as much as three times what they are in healthy persons.

THE DEEP CREEK MINES. of which so much is being said at present, lie partly in Nevada, The Dugway and Fish Springs mines are wholly in Utah.

USEFUL INFORMATION.

Animal Intelligence.

Animal intelligence is quite as common and pronounced whether we observe it in the largest of the species or in the families of insects. The ant is proverbial for its intelligence. Even the loathsome spider is quite remarkable for the intelligence it sometimes exhibits. This insect is quite as susceptible of being tamed as any other species. A European semi-scientific journal, the *Month*, relates the following in regard to

The Spider.

It is a well-known fact that spiders have power of discrimination, and are able to discriminate between friends and foes, approaching those whom they have found to be friendly, while avoiding strangers. One lady succeeded so well in taming spiders to recognize her, that they came down to be fed whenever she entered the room where they were kept. Dr. Moschen, of Leipzig, relates that in Oderwitz, where he lived for a time, he noticed one day in a rather dark corner of the ante-room a tolerably large spider's web, in which a well-fed spider had made its home, and sat at the nest-opening, early and late, watching for some flying or creeping food. He was accidentally several times a witness to the craft with which it caught its victim and rendered it harmless, and it soon became a regular duty to provide it with flies several times a day, which he let down before its door with a pair of pincers. At first this feeling seemed to arouse small confidence, the pincers, perhaps, being in fault, for it let many of the flies escape again, or only seized them when it knew they were within reach of its abode. After awhile, however, the spider came each time and took the flies out of the pincers and spun them over. The latter business was sometimes done so superficially, when flies were given quickly, one after the other, that some of the already ensnared flies found time and opportunity to escape. This game was carried on by him for some weeks, as it seemed ominous. But one day, when the spider appeared ravenous, and regularly flew at each fly offered to it, he began teasing it; as soon as it had got hold of the insect, he pulled it back again with the pincers. It took this exceedingly ill the first time; however, as the fly was finally left with it, the indignant spider managed to forgive him, but, when later he took the fly quite away, their friendship was destroyed forever. On the following day it treated the offered flies with contempt, and would not move, and on the third day it had disappeared from its abode altogether.

The Elephant.

Passing from one of the smallest orders of creation to the largest, we come to the elephant. The *London Spectator*, in one of its late issues, gives the following in regard to an elephant which could evidently count up to 20 and could not be cheated out of his count. One Arthur Clay sends the following to the above-named journal:

It was told me, he says, by Mr. Quay, at the time a non-commissioned officer of the First Battalion of the Sixtieth R. Rifles, but now one of her Majesty's yeoman of the guard. In 1853 his regiment was marching from Peshawar to Kopulvie, and was accompanied by a train of elephants. It was the duty of the mahout in charge of each elephant to prepare 20 chupatties, or flat cakes made of coarse flour, for his charge. When the 20 chupatties were ready they were placed before the elephant, who, during the process of counting, never attempted to touch one of them until the full number was completed. On the occasion related by Mr. Quay one of the elephants had seized the opportunity of his mahout's attention being attracted for a moment to steal and swallow one of the chupatties. When the mahout, having finished the preparation, began to count them out, he of course discovered the theft and presented his charge with 19 in place of the usual number. The elephant instantly appreciated the fact of there being one less than he had a right to expect, and refused to touch them, expressing his indignation by loud trumpeting. This brought the conductor of the elephant line (with whom Mr. Quay had been in conversation) to the scene. Having heard the explanation of the mahout, the conductor decided that he was in fault for not keeping a better lookout and ordered him to provide the twentieth cake at his own cost. When this was prepared and added to the pile, the elephant at once accepted and ate them.

WRITING ON THE CAR.—There are two ways of writing on a train. The first requires that the paper be laid upon a light board, perhaps 18 inches square; one end of this will rest in your lap and the other end farthest from you will be raised a few inches by a cord which passes around the neck. The whole affords a sloping desk which moves with the body and is fairly satisfactory. The simpler, and perhaps the better plan, is to place your tablet upon a feather pillow in your lap, when you will find that the elasticity of the feathers reduces the motion to a minimum and make writing easy.

AN AUTOMATIC LIFE SAVING BELT has been tried in the Thames. It can be screwed up like a hall and fired from a cannon or thrown by hand, the belt righting itself by contact with the water.

ELECTRICITY.

A NEW STORAGE BATTERY.—The *Electrical World* of May 16, contains a description of a new storage battery, which, it says, "promises better things than have up to the present time been obtained" in this form of electric traction. The chief peculiarity of the new system is the use of an improved form of the alkaline storage battery, instead of the old lead accumulators that have been a constant source of trouble and expense to those who have undertaken to use them for traction purposes. The chemical actions in it are comparatively simple, and are found to be almost completely reversible, so that the tendency to deterioration is very small. Its adoption has enabled Messrs. Waddell & Entz, the inventors, to reduce the weight of battery required for a 50-mile run of a car to 3000 pounds, instead of the 4000 or 5000 which have usually been employed in cars operated by the ordinary batteries. The motor is arranged to be reversed and to operate as a charging dynamo while the car is running down grade or stopping. In this way a certain proportion of the energy spent on the car is recovered. The experimental trips of the new car have been unusually successful, and give promise of commercial practicability, which is more than can ordinarily be said of storage battery cars. The secret of success probably is, after all, the lightness of the whole car equipment, thus greatly reducing the amount of power necessary to operate the car.

ELECTRIC CARS, LIGHTS, ETC., RUN BY WATERFALLS.—In the town of Dover, on the Salmon Falls River, on the division line of Maine and New Hampshire, the water power furnishes not only light and heat to that town but to several distant towns also. Power is also furnished to a street railway seven miles in length. The water wheel has a capacity of 500 horse power.

In Greenwood Springs, Colorado, the electric lights, mills, pumps, hoists and tramways are successfully run miles away from the power station at the falls. In Ireland, the Giant's Causeway electric railway, eight miles in length, derives its power from two turbines that drive dynamos which deliver electric power to the motors of the railway.

At Burgenstock, near Lucerne, Switzerland, there is an electric mountain railway a mile in length, operated by two dynamos of 25 horse power, worked by a water-wheel of 125 horse power. Between Pazzala and Lugano, in Italy, there is a waterfall which supplies 300 horse power to run two dynamos, one for working tramway motors, the other supplying nearly 2,000 lamps at the hotel and private buildings.

DEVICE TO PREVENT STEALING OF TELEGRAPH MESSAGES.—The Belgian military telephone system has just been put into service. The essential feature of such a service was that messages could not be stolen by tapping of the wires and the insertion of a receiver. This danger was electrically without remedy by any known appliance, so its solution was temporarily made by placing a peculiarly constructed bell at the receiver, which would automatically tap at the precise moment of beginning and of ending conversation. In this way operators could be sure, by a system of countersigns, that they were in communication with the proper parties before talking secretly. Then the bell would sound an alarm in case the circuit was interrupted for any purpose.

ELECTRICITY IN THE UNITED STATES.—One-third of all the telegraph lines, one-half of all the telegraph wire, and one-quarter of all the telegraph stations in the world are within the United States. In 1890, there were 800,000 miles of wire and over 24,000 offices, quite a contrast with the 80,000 miles of wire and less than 2,400 offices in 1866. Now they transmit not far from 70,000,000 messages in a year. The submarine cable systems of the world stretch over 120,070 nautical miles, the ten European-North American cables representing 23,000 miles, over which 10,000 messages daily pass between the two continents. Without the co-operation of telegraphy what would the business of the world amount to?

UTILIZING NIAGARA FALLS FOR ELECTRICAL WORKS HAS BEEN COMMENCED.—The Falls Park Commissioners have made an agreement with a strong syndicate of English capitalists, the owners of large electrical works at Deptford, England, who have deposited \$20,000, which is to be forfeited if the operations for the utilization of the power of Niagara Falls are not begun before March 1, 1892.

ELECTRICITY IN MINING.—To-day, there are between 30 and 40 mines in this country using electricity for either illuminating or power purposes, and with such success that electric mining engineers look, in the immediate future, for an immense demand from many of the mines of this country.

BLACK GRAVEL.—The *Trinity Journal* says that prospectors in Siskiyou county have lately struck some black gravel on what is called Greenhorn Gulch, which contains a large amount of the precious metal. The gravel and gold is almost jet black and promises to equal, if not excel, the famous blue gravel discovered in that county.

ENGINEERING NOTES.

TO REMEDY SWAYING AND OSCILLATION.—Frequently the oscillations of the main belt in a mill come in unison with the beat of the engine, and a pretty perceptible slapping about the belt is noticeable, says the *Artisan*. The beat of an engine will often come in sympathy with the rhythmic sway of the building, and so increase it as to be very perceptible. If this were continually going on, in exact time, it would become so great in time as to be dangerous, but one or the other gets ahead and mixes the movement, so that it gradually ceases until they are again in unison. If the speed of the engine is changed in either case, the swaying will be kept mixed all the time instead of occasionally. On long lines of shafting this will appear also, the pull on the belt at the commencement of the stroke being in unison with the spring of the shaft, thus causing a marked oscillation. The same remedy is applied here, to mix the two movements purposely, and the trouble is partly removed, if not entirely.—*Ex.*

FILTER FOR WASTE OIL.—Among the ways for freeing oil from dirt and impurities, a good one is to stir it up with a hot solution of washing soda, and settle in a warm place until the oil is quite clear; then run off the water at the bottom of the vessel. If you prefer to filter it, a very simple filter is made by knocking out the bottom of the box and covering it with gauze wire; then place a layer of cotton wool over this, and pour the oil through it. The former process is much preferred, although it is more troublesome, because it not only extracts the solid dirt, but also extracts dirt out of solution in the oil.

IN COTTING THREADS IN AN ENGINE LATHE where the lead screw is used, many have wondered why the clamp nut could not be thrown out and in instead of running the lathe backward so much, nearly half the time at least. The trouble all seems to be in locking in the clamp nut at the right moment. With some threads it would be impossible to lock it in wrong, and with others it would be hard to catch it at the proper instant. In either case, it is better to leave a few extra threads as guides to show the position of the thread tool before it comes to the thread proper, and turn off the dummies afterward whenever there is a chance.

GRAVITY, it is said, always acts downward, and so it does, but the effect that it produces is not always found in the same direction. A weight attached to a fly-wheel hangs toward the center when it comes on the upper side, and draws away from it when it arrives in the lowest position; but under a high speed the force of gravity gets belated to such an extent that this in-and-out action comes nearly horizontal. The same thing is seen when a wheel is running out of true. If an object is held up against it, the wheel seems to be affected more on the opposite side than at the place where the blow was received.

SKILL IN USING THE SAW.—Almost any one can run a hacksaw for awhile, but there are a few who can make them hold out as long as they ought. The knack is said to lie in a true hand that can draw and drive them without any sideways motion, and keep a constant pressure on the work; but we find that a firm and steady grasp has something to do with the business that will hold a saw to its work and not let it get the upper hands when stepping from thick into thin stock.

DRIVING SHAFTING.—Why does it take eight times the power to drive a shaft of a given diameter that it would one which is only half as large in diameter? It is owing to the weight being increased four-fold whenever the shaft has been made twice as large in diameter, and the space the resistance has overcome being in direct proportion to the circumference in both cases.

A good illustration of how the fibers of cotton will catch on to everything is shown in the machine shop when a nut is tapped out a little too small, or the adjustable die-plate left a little large. A piece of cop waste is wrapped around the tap, and once more made to find its way through the nut, with the result of making it more easy on the bolt.

AN OLD BELT.—The *Westbrook Chronicle* says: "There is an old belt in the first mill built at the Westbrook Manufacturing Co.'s plant, that has been in constant use since the mill was built in 1831, and will stand many years of wear yet." The cattle of '31 must have had tough hides, or the tanners of those days more skilled than those of the present day.

BELTS.—It has been said that the best way to run a belt is to use three thin ones, one over the other. About all the two outside belts could do would be to hug the inside belt to the wheels and let it do all the work while the others are being chafed to pieces. Better rivet them all together into one solid belt.

The colnage at the San Francisco Mint for the month of May was as follows: Double eagles, \$880,000; standard dollars, \$550,000; dimes, \$46,075; total, \$1,476,075.



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Business Announcements.

[NEW THIS ISSUE.]

Electric Power Transmission—Thomson-Houston Electric Co.
Concentrating Belts—The Blasdel Concentrating Belt Co.
Placer Amalgamators—Eucyrus Steam Shovel and Dredge Co., Bucyrus, Ohio
Assessment Notice—Gray Eagle Mining Co.

See Advertising Columns.

Passing Events.

It is noted elsewhere that the Anti-Debris Association is bringing more suits against hydraulic miners and actively continuing the fight against this industry. In due time, the memorial of the Legislature will doubtless be acted upon by Congress, and steps taken by which the gravel miners may work the mines without injuring the farming industry along the rivers.

River mining, which has not been prosecuted to a great extent of late years in this State, shows signs of a revival, owing to the fact that there is less debris in the rivers than formerly and the old method of wing-damming may be more readily applied to get at the river bed.

There are rumors that the mints will shortly cease the coinage of silver dollars, here and elsewhere. There are in the Branch Mint in this city \$36,000,000 in silver—all dollars—but there is storage room for as much more.

The scheme of working the material in the Carson river by means of a dredge will shortly be tested, after a long delay.

California the Staid and Even-Going.

While the business of mining at many of its important centres elsewhere seems to be just now considerably depressed, no complaints of this kind are heard from any part of California. In the Wood River country, Idaho, as also in some of the big camps of Montana, mining operations are less active than formerly, nor do certain districts in Washington appear to have made as rapid progress as was expected, nor as rapid as their acknowledged merits would seem to have warranted.

This depressed condition of mining affairs is imputed to a stringent money market, tending, not only to restrict investments, but also to check operations in the products of these mines, which consist mainly of lead and copper. To this there might no doubt justly be added an element of speculation, something of a "boom" having of late obtained throughout these several countries, where a halt has been called in the growth of the leading cities as well as in certain branches of mining. Neither Denver, Hailey nor Leadville have forged ahead the past year as in more prosperous times was their wont. All have found it necessary to slacken their pace somewhat, waiting a little till the mining industries catch up. This check is, of course, but temporary, nor has it anywhere caused serious embarrassment to any interest or branch of business in these great and onward moving countries.

Reverting to California, it may be observed, that we have experienced here no mining hitch, nor has the business of late been at all intermitted. Bullion production has every where been steady if not rapid, one reason of this being that the output of our mines consists mainly of gold, always marketable at a fixed and remunerative price, which can hardly be said of lead and copper, or even silver. Mining with us is therefore characterized by a certainty and a stability not common to the business in the other States mentioned.

And as mining has gone on with so little change, so has the growth of our cities and towns been equally steady, this being especially true of San Francisco, which, if it has not hounded ahead, like many other Western cities, has increased year by year, keeping abreast of her business, without outgrowing the same, or drawing unduly heavy drafts on the future. She has, in fact, never built much beyond her actual and immediate necessities.

San Francisco has, in years gone by, had her set-backs, but they were never ruinous. And California has had her mining failures. But these, too, are of the past. Not for a long time has any large amount of money been lost through investments in our mines, nor is it probable that much will be lost in the future. Of all our industries, gold-mining has come to be the most safe and the most sober. Of this once last State it may even be claimed that she has, as a whole, become eminently staid and conservative, if not a little slow going. But if some of her younger neighbors have seemed to outstrip California in the race for population and wealth, this has not excited in the breasts of her people either jealousies or heart-burnings, so largely have these countries been colonized by her and so nearly are we all identified in interest and feelings.

The Later Rains and Their Effects.

Commencing on Wednesday evening a drizzling rain, slight but continuous throughout the night, fell in this city, the precipitation in various localities farther north having been much heavier. This recent rain, with the occasional showers that fell all through the month of May, has constituted this an exceptional spring in California.

As the hay harvest is now well advanced, and that of grain already begun, these unusual and unwelcome showers have caused the hay-makers much inconvenience, and in certain localities, some considerable loss. It is our wont to lay great stress on these slight rains, which, when they occur, fail not to provoke both comment and complaint everywhere in California; the long dry seasons on which we can count with so much certainty, having tended to spoil our people in this respect.

Throughout the entire Atlantic region a two-days' steady rain in harvest-time is a common occurrence. There, too, heavy thunder showers come up on the instant, and falling in a deluge, drench the hay and grain when, perhaps, just

well-onred and ready for the barn, necessitating their being spread out and dried again, the farmer being fortunate if this process of drying is not forced upon him more than once. A little experience like that would lead the average Californian to better appreciate the many climatic advantages he enjoys, if it did not cause him to cultivate more painstaking, and serve to develop in him more fully the virtue of patience.

Scarcity of Miners Abroad.

There are complaints in New South Wales regarding the scarcity of good hard-ground miners, and the progress of the mining industry is retarded for want of suitable labor. The fact that good miners are in strong demand is sufficiently shown when the famous Broken Hill Proprietary Co., one of the strongest mining companies in the world, is under the necessity of advertising for steady men at 10 shillings per shift of eight hours. This is a leading company at a great mining center, so other companies in more sparsely settled districts must suffer even more for lack of competent labor.

This seems strange when it is known that never in the history of Australia has there been a time when so much attention was given to mining enterprises, or when so much labor and capital was embarked in the industry as at present. Miners are found, not as solitary prospectors, but in strong parties and groups of parties carrying on systematic work in nearly every accessible area of the continent.

The Australian Mining Standard says that one cause contributing to the present scarcity of miners is "probably the fact that a vast amount of work which miners can best perform is now being done in connection with railway sewerage and other public works in the mother colony. Then again, the colonial youth does not take kindly to the miner's occupation, and the lack of in-migration on his part, combined probably also with lack of proper provision for training boys in mines has left us without a sufficient number of recruits to fill gaps in the ranks of the older workers, and to meet the increasing necessities of a growing industry."

Whatever the causes, it is evident from the local papers that the position in New South Wales is a serious one, and in many instances operations are either being carried on at a great disadvantage or are absolutely suspended for want of competent labor. There are plenty of men of a certain sort to be had, but they are next to useless for the work required of them. The climate in the districts where labor is most in request is favorable, and the general conditions of life are such as to meet all reasonable requirements. The wages of miners in the districts of Hillgrove, Bengara, Wellington and Lewis Ponds are £2 10s. per week, and Broken Hill £3 per week.

More Mining Injunctions.

The special counsel for Sacramento county in the suits against the hydraulic mines secured recently an injunction from Superior Judge Davis of Yuba City, against eight mines on the North and Middle Forks of the American river. The papers have been served and the mines have stopped work. The agents have been on the scene ever since, and state that up to date the mines have continued to obey the order. Two or more have signified their intention to fight the cause, but none of them appeared to be willing to defy the order of the court and run the risk of suffering the heavy penalty attached to the violation thereof.

The parties enjoined are: S. M. Pragne, mine located on the ridge in Indian canyon, North Fork of the American river; the claims formerly known as the Washington and Blue Wayne; W. R. Morton, in the vicinity of Indian canyon; Rudolph Dekouse, on the North Fork, whose tailings dump into Indian canyon; A. Rosetti, on the North Fork of the American river; Henry Del Ray, on Iowa hill, whose tailings dumped into Indian canyon; Alexander Rossi, Homeward Bonnd claim, which dumps into the North Fork; G. M. Lihby, near Indian canyon; Parker, near Indian canyon.

In addition to these suits brought in the State court, a number have been brought in the United States Circuit Court in the name of the Federal Government. In such of these last named suits as affect the miners on the American river, Sacramento county will push the prosecution through its special counsel.

The Anti-Debris Association will prosecute such of the cases as affect Yuba and Sutter counties. The persons who have been proceeded against in the Circuit Court, and who come within the jurisdiction of Sacramento county, are O. J. Spencer, W. O. Spencer, J. F. Brown, J. D. Pursley, J. F. Brown Jr. and a man named Gleeson. Mr. Devlin, the special counsel, states that he has several other suits in preparation.

George Ohleyer, President of the Anti-Debris Association, says there are 40 hydraulic monitors operating in Plumas county, notwithstanding the injunctions. Other members of the association, of whom the Marysville Appeal has made inquiry, said the outlook is not very encouraging.

Electric Roads.

Work on a new electric railroad was inaugurated at the junction of Page and Clayton streets on Monday, C. E. Mayne, President of the Metropolitan Railway Co., digging the first spadeful of earth. The first portion of the road will be built from Clayton St. east, as the franchise calls for, to Market St., and a mile is to be completed before July 1st. The real estate agents present and those who have so far expressed an opinion as to the effects of this road upon South Side real estate predict that its effect will be most beneficial, and will certainly stimulate a great activity in this section before fall. The road should bring into market great numbers of residence lots.

It is to be hoped, however, that the company has carefully considered its electric plant, for we have had too many failures in this State already. The last extensive electric road built, that from Oakland to Berkeley, only ran a few weeks, and then had to stop to have an entire change of its electric plant. It is explained that the motors burned out, or that the power was insufficient; but whatever the cause, the fact remains that, under the plan adopted, the cars had to stop running.

This is the fourth or fifth instance of the kind we have had in California, and it has naturally caused a distrust of electric roads. It is understood, of course, that they run successfully elsewhere, and it seems strange that the electricians who have had charge here have been unable to arrange its appliances satisfactorily. Cable roads are built and operate steadily from the first day. There is no apparent reason why electric roads cannot be made to do the same. But the experience here with electric roads has by no means been satisfactory up to this time. Notwithstanding this, more are projected and being built, and some are operating all right. But the projectors should exact a guarantee from its electrical supply companies, and they ought to get competent men and proper machinery in the first place, and not experiment with other people's money.

Silver Coinage.

It is expected here that the coinage of silver at the Branch Mint will shortly be stopped wholly or in part. No orders have yet been received by the superintendent to reduce his working force, but it is intimated that the end of this month, which closes the fiscal year, will see the dismissal of a number of the coin-makers. There are now in the vault of this Mint \$36,000,000 in silver, and there will be \$1,000,000 more by the end of June, but there is plenty of room for as much more, so the reason for suspension of coinage is not lack of vault room.

This proposed stoppage is the result of the law passed by the last Congress. After the 1st of July the Mints will only coin what is demanded, and the rest will be stored. The Mints are required to purchase monthly up to 4,500,000 ounces if presented for sale, and this silver will be stored instead of coined. All the silver in the Government vaults on this coast and at the East has silver certificates issued against it and the certificates have gone into circulation. This is to be the policy in the future—issuing silver certificates against all silver bullion purchased, so that it makes very little, if any, difference whether it be coined or remain intact, so long as the certificates circulate.

THE PATENT OFFICE at Washington has a printed circular which it sends to inventors of machines for "perpetual motion," setting out the fact that the thing is an impossibility.

Mine Timbering.

The square system of timbering, in use in most of our large mines here on this coast, was first introduced in Australia by Mr. W. H. Patton, who adopted it in the Broken Hill Proprietary mines, although it does not seem to be so satisfactory to the people there as to our miners, who are more familiar with it. The accompanying description and plans were furnished by Mr. Patton to the report of the Secretary of Mines for Victoria:

"The idea is supposed to have originated in the German mines, but in a crude form. It was introduced among the mines of the Pacific Coast of America some 20 years ago, by a gentleman named Diederheimer. Its use there is universal, and experience has evolved it from the embryo state to its present perfection. The old system and its accompanying disadvantages

inches; they are moved from place to place as required, and upon them the men stand when working in the stopes and in the faces. A stope resembles a huge chamber fitted with scaffolding from floor to roof. The atmosphere is cool and pure, and there is no dust. Stage is added to stage, according as the stoping requires it, and ladders lead from one floor to the other; the accessibility to all the faces is a great advantage.

If, while driving, a patch of low-grade ore is met with, it can be enriched by taking a higher class from another face, and so on, any grade can be produced by means of this power of selection. Opinions have been expressed that this system of timbering is not secure, and that pressure from above would bring the whole structure down in ruins. But an opinion such as this is due to miscomprehension of the facts. If signs of weakening in the timbers become

Hamilton Corliss Engines.

We illustrate on page 269, the Hamilton Corliss engine of a compound tandem type. These engines are so well known that it is unnecessary to describe their perfect proportions, high finish and general excellence.

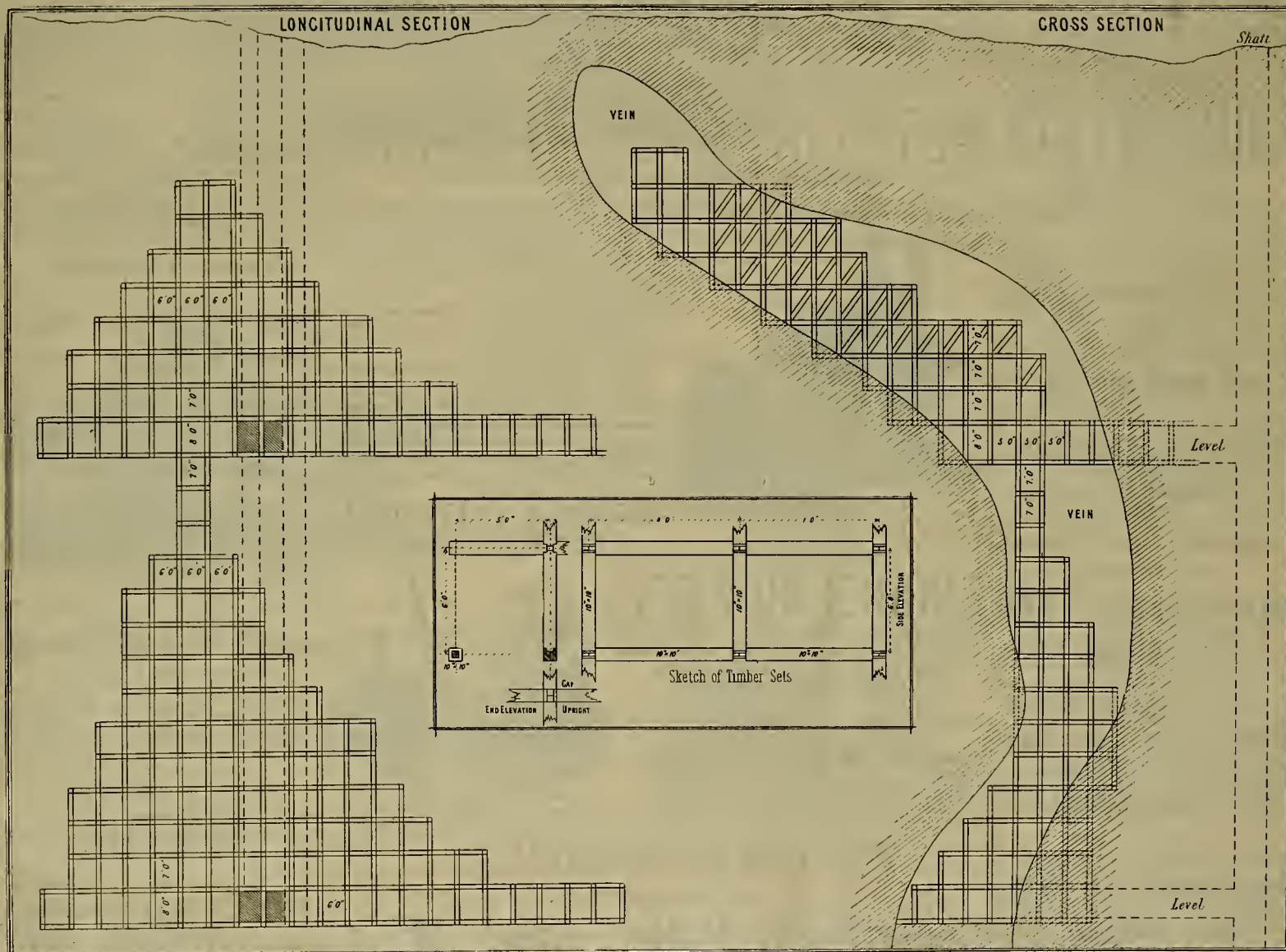
This company has one of the largest, if not the largest works in this country for solely manufacturing Corliss engines. As they confine themselves to the building of these engines, they have been able to arrange their works with a complete line of special tools for their production, insuring low cost, and at the same time absolute accuracy in all details.

This company is prepared to guarantee on their engines a water consumption duty of 13½ pounds of water per horse power, per hour, on their triple expansion engines, and 15 pounds on their compound condensing. This is

trio Light Company of St. Louis, eight. We mention these two out of the many electric light companies using the Hamilton Corliss engines, as they are the largest companies in existence. These engines are represented by Messrs. Rix & Birrell, No. 38 and 40 Fremont St., who are sole agents for the Pacific Coast.

Important Mining Decision.

Judge Hawley, presiding in the U. S. Circuit Court at Carson City, Nev., has decided the case of Walcott vs. Watson, involving a one-half interest in the celebrated Joanna mine in White Pine county, Nev. The decision related to the removal of the case under the Act of Congress of August 13, 1888, from the State Court to the Federal Court on the ground of local prejudice and influence. Mrs. Walcott brought the suit in the State Court for one-half



PLAN AND SECTION SHOWING THE SQUARE SYSTEM OF TIMBERING IN MINES.

are well known. A drive would be put in for a certain distance, when it had to be abandoned until it could be filled up with waste material and made secure. This process entailed much expense. The staff had first to be broken on the surface, then sent below, trucked along the drives, and finally shoveled into place. Ventilation was impaired and the drives were filled with dust. The men worked in discomfort, and were not in a condition to perform a full measure of labor. Under the system as adopted in the Proprietary mine, these disadvantages disappear. The cost is one-third less, ventilation is perfect, and every portion of the faces are accessible at all times. Sawn timber is used throughout, the upright and cross-pieces are 10 inches by 10 inches, and stand 4 feet 6 inches apart; along the course of the drive, the cross-pieces are 5 feet in length, and the height of the main drives and sill-floor sets are 7 feet 2 inches in the clear. In looking out the stopes, the uprights are 6 feet 2 inches, just one foot shorter than those in the main drives. The caps and struts are of the same dimensions and timber as the sill floor. The planks used as staging are 9 inches by 2½

apparent, the remedy is very simple. Four or more of the uprights are lined with planks, and waste material is shot in from above, and a strong support is at once formed, or if signs of crushing are noticed, it is possible to go into the stopes, break down ore, and at once relieve the weight.

HENRY EDWARDS, the actor, died in New York on Tuesday. He was well known in this city where he was one of the founders of the Bohemian Club, and a leading member of the California Academy of Sciences, of which he was for several years the honored vice president. Mr. Edwards was an entomologist of distinction and had one of the largest entomological collections in the world. He made special studies of lepidoptera and coleoptera. Mr. Edwards was one of the most genial of men, greatly liked by all who knew him. He wrote a great deal on entomological subjects and described some 300 new species in this country.

THE British House of Commons is considering a proposition to make the insurance of miners' lives compulsory in Scotland. It is enforced in many of the English mines already. It is proposed to pay the premiums by deducting a small amount monthly from the pay of the men.

the basis on which all makers of high-class engines contract in the Eastern States, and is almost unknown on this coast. This insures both a high economy and perfect proportions, and through this close competition on these guarantees, the present high perfection of these engines has been attained.

All these engines are built by the use of jigs, thus making all duplicate parts exact duplicates of the parts furnished originally with the engine. Their handwheels are turned off on the engine shafts on which they are to run, thus insuring their being absolutely true in service.

The Company has built up to date more than three thousand of these engines, in many cases receiving from the same Company orders that ran through several years, for five to ten engines, showing the entire satisfaction they have afforded them. They have at this date orders ahead for over forty engines at their works. These engines are specially designed for electric light and road service, and for the use of flour mills.

In New York, the Manhattan Electric Light Company has twelve, and the Municipal Elec-

of the mine and an accounting. Watson filed an answer in the State Court denying the claims of plaintiff and setting up a counter claim for \$40,000 against Mrs. Walcott. Mrs. Walcott thereupon, being a citizen of California and Watson of Nevada, although she was plaintiff on the record, filed a petition for the removal of the case to the Federal Court on the ground of local prejudice and influence against her, asserting that as to the counter claim she was defendant. Judge Knowles of Montana made the order to remand and counsel for Watson moved to remand. Judge Hawley held that the case was properly removed, and that it is now and has been since the order of removal in the U. S. Circuit Court.

The State Court, notwithstanding the order of removal, tried the case ex-parte and rendered judgment for Watson. The attorneys for Mrs. Walcott relied upon the order of the Federal Court and were not present at the State trial. The decision of Judge Hawley was a victory for Mrs. Walcott and the cause must be tried in the Federal Court. A. C. Ellis and W. Beatty of San Francisco represented Mrs. Walcott, and Messrs. Wren, Cheney, Rives and Beatty represented Watson.

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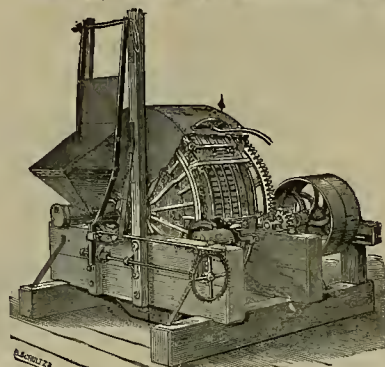
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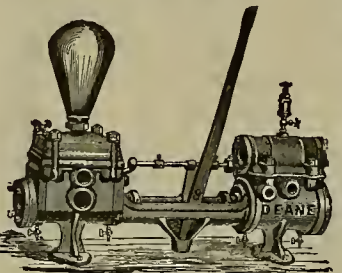
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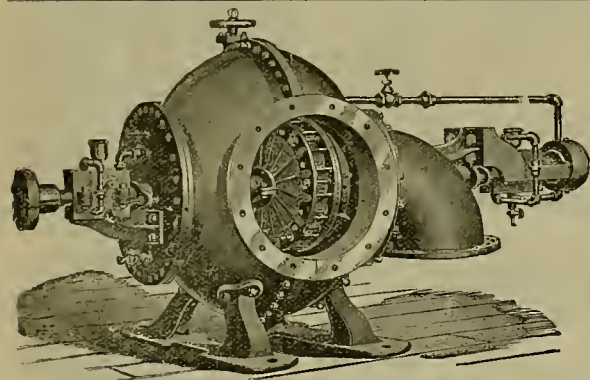
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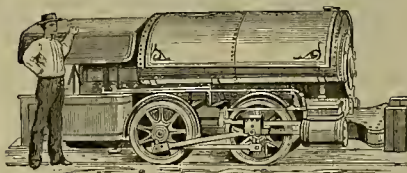
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Any stock upon which this assessment shall remain unpaid on the 14th day of July, 1891, will be delinquent, and advertised for sale at public auction; and unless payment is made thereon, will be sold to pay the amount due on the 1st day of August, 1891, to pay the delinquent assessment, together with the costs of advertising and expenses of sale.

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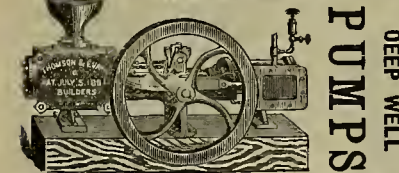
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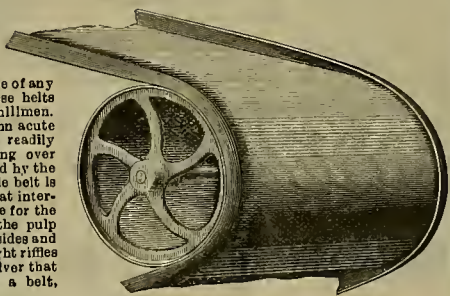
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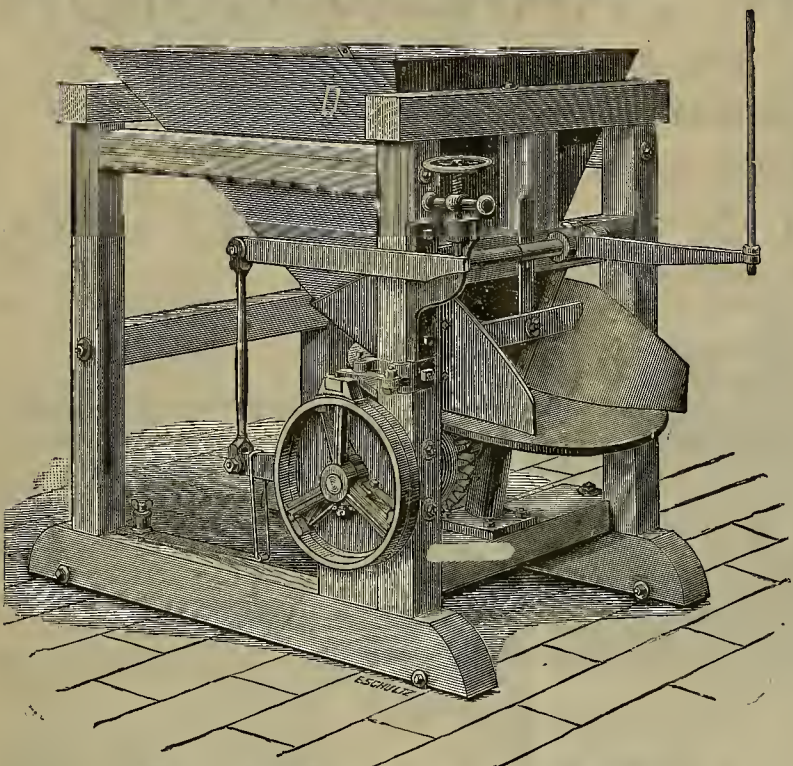
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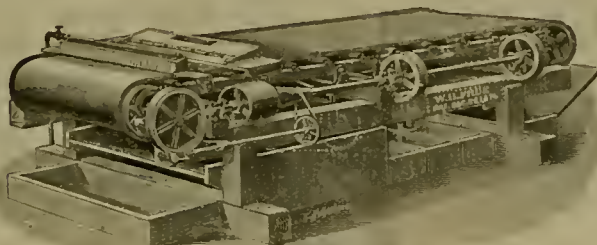
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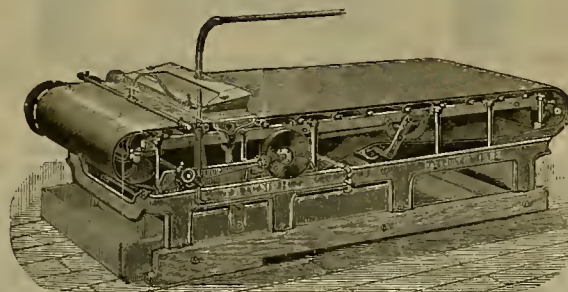
N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs," for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt - - - \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.



JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)

Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.

GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1886.

Joshua Hendy Machine Works, 39 to 51 Fremont St., S. F., Cal.:

GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.

At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrators is the equal, if not superior to any other style of Vanners or concentrating devices. DAVID McKAY, JR.,
(Signed) Sup't North Star and Original Empire Mining Co.

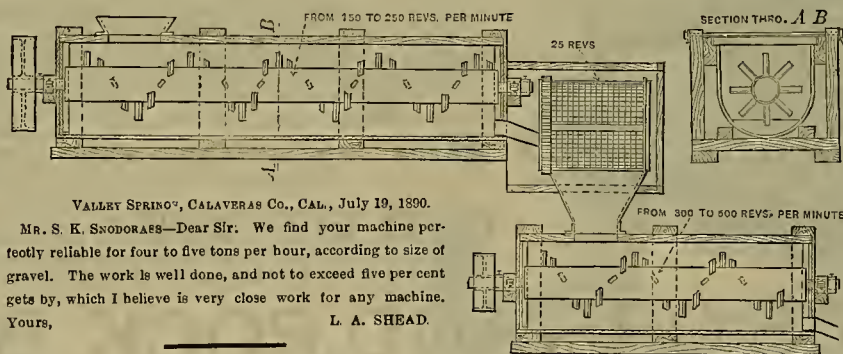
N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

COMMON SENSE PULVERIZER AND CONCENTRATOR.

This is the most successful machine yet discovered for working Gravel, Cement, Clay, etc. It avoids crushing the rocks which are washed clean and at the same time pulverizes the Cement or Clay and SAVES EVEN FLOUR GOLD.

It is only necessary to have about six inches of water to work 100 tons or over per day.

Full particulars given by addressing:



VALLEY SPRING, CALAVERAS CO., CAL., July 19, 1890.

MR. S. K. SNODGRASS—Dear Sir: We find your machine perfectly reliable for four to five tons per hour, according to size of gravel. The work is well done, and not to exceed five per cent gets by, which I believe is very close work for any machine. Yours, L. A. SHEAD.

SAN FRANCISCO, March 25, 1891.

S. K. SNODGRASS, Esq.—Dear Sir: In regard to the work done by your machine, which we have had in operation for the past three months, I can say that it has handled successfully all material as taken out of our ground, the only cement which was not perfectly broken up being an exceedingly hard cement material approaching rock in its hardness.

For all free wash and moderately hard cement it will do very good work, and must effect a great saving in working such gravels and cements, owing to the small head of water required; and furthermore, its great gold-saving qualities, as I am satisfied that fully 95 to 98 per cent of the gold freed in the machine is saved, even to flour gold, and that too without the use of quicksilver.

The automatic rejection of all rocks and material by the revolving screen makes the handling of the gravel cheaper, as all hand culling of the material is rendered unnecessary. Truly yours, W. W. B. STEVENS.

S. K. SNODGRASS, 220 Sutter Street, San Francisco.

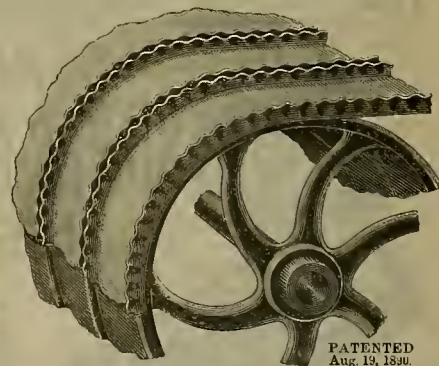
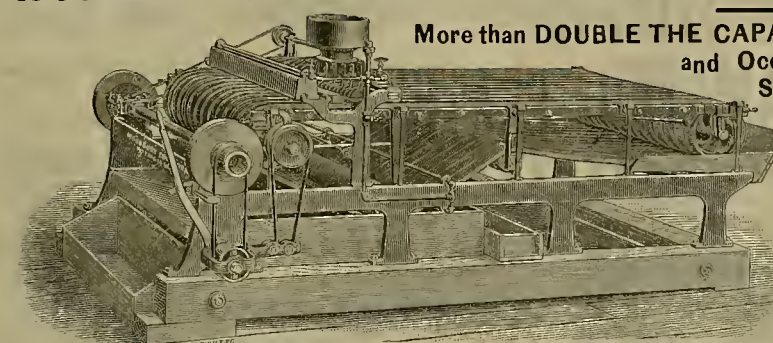
WOODBURY ORE CONCENTRATOR WITH IMPROVED BELTS.

More than DOUBLE THE CAPACITY with One-Half Less Power and Occupying Less than One-half the Space of any other Concentrator.

Built of Best Steel and Wrought Iron.
STRONG AND DURABLE.
Price.....\$575 f. o. b.
Send for Catalogue and Testimonials

The annexed cut shows the belt in its improved form, which consists of corrugated edges, to form an expanding top edge. This excess in length of material effectually prevents the edges from cracking; plain edge belts have to stretch about one inch to the foot as they pass around the drums. This continuous stretch cracks the edges. The improved belt obviates that difficulty.

GEO. E. WOODBURY, Man'r, 213 to 219 First St., San Francisco.



PATENTED
Aug. 19, 1890.

F. A. HUNTINGTON.

MANUFACTURER OF

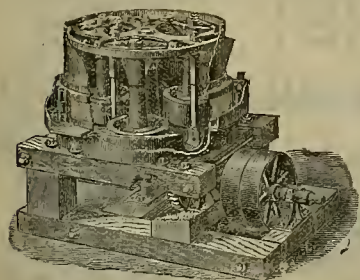
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Concentrators and Ore Crushers,

Mining Machinery of Every Description.

Steam Engines and Shingle Machines.

SEND FOR CIRCULAR.



Centrifugal Roller Quartz Mill.

213 FIRST STREET.

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PARKE & LACY COMPANY

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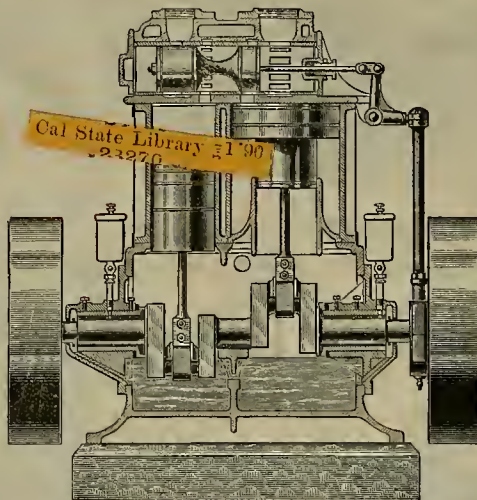
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Grand Total, 309 Engines, Aggregating 13,975 Horse Power.

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Will do more than twice the work of any other with the same cost in wear.

Gives a fineness of product that increases the capacity of any mill from 25 to 40 per cent without any additional expense. THE BEST AND ONLY CRUSHER ADAPTED TO MACADAM ROAD WORK. Send for Circular.

THE PELTON WATER WHEEL CO., 121-123 Main Street, San Francisco, General Western Agents.



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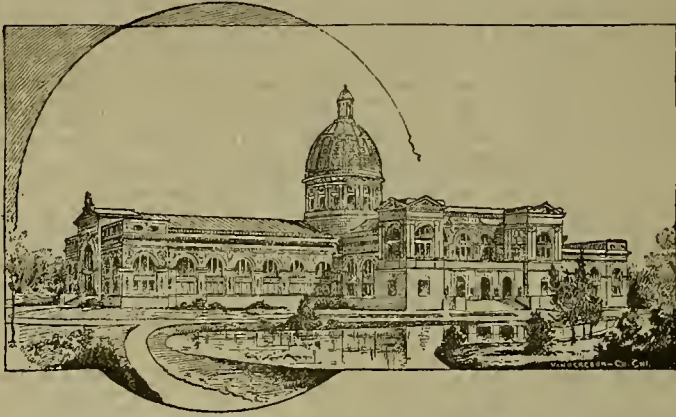
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SAN FRANCISCO, SATURDAY, JUNE 20, 1891.

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THE U. S. GOVERNMENT BUILDING.



BUILDINGS OF THE STATE OF ILLINOIS.

Columbian Exposition Buildings.

Illustrations are given on this page of a few of the many fine buildings which are being erected in Chicago especially for use in connection with the coming World's Fair. The great buildings of the exposition will be one of its chief attractions. Their gilded domes, colossal pillars and splendid proportions will be recalled after the displays in them have been forgotten. The noblest achievements of American architecture will be arrayed around a grand court, producing an effect alike impressive and inspiring. That wealth of architectural splendor will cost something like \$12,000,000 with the attending landscape effects. By common consent, the buildings which have been designed to house the various exhibits have been termed palaces, a title which their magnificent proportions and artistic lines have fully earned. It is doubtful if such an aggregation of palatial structures has ever been gathered together within such a compass. Twelve stupendous buildings, any one of ten of which will cover more ground than the National Capitol at Washington, monuments alike to the genius of the architects as well as the progress of National architecture, fitting temples in which to celebrate the anniversary of an event of unequalled importance in the history of the Western Continent, and scores of

other magnificent edifices—such will be the World's Fair edifices at Chicago in 1893.

The United States Government Exhibition building was the first Exposition structure to be planned. It will occupy a site near the Lake Shore, south of the main lagoon and of

is classical in style, and bears a strong resemblance to the National Museum and other Government Buildings at Washington. It will cover an area of 350 by 420 feet, will be constructed of iron, brick and glass, and will cost \$400,000. Its leading architectural feature is

been pronounced by many architects second only to Richard M. Hunt's Administration Building in the magnificence of its proportions. This building will be 850x500 feet and cost \$450,000. It is located at the extreme south end of the park, midway between the shore of Lake Michigan and the west line of the park. It is just south of the Administration Building.

The building is spanned with three arched trusses, and the interior will present the appearance of three railroad train-houses side by side, surrounded on all the four exterior sides by a 50-foot gallery. In each of these long naves there is to be an elevated traveling crane for mining machinery. Steam power for this building will be supplied from a powerhouse adjoining. The two exterior sides adjoining the grand court are to be rich and palatial in appearance. The two facades of Machinery Hall on the court are rich with colonnades and other features.

The design follows classical models throughout, the details being followed from the renaissance of Seville and other Spanish towns, as being appropriate to a Columbian exposition. An arcade on the first story admits passage around the building under cover. A colonnade with a space at either end forms the length between Machinery and Agricultural halls.

The Agricultural Building is to be put up
(Continued on page 593.)



MACHINERY HALL AT THE WORLD'S COLUMBIAN EXPOSITION.

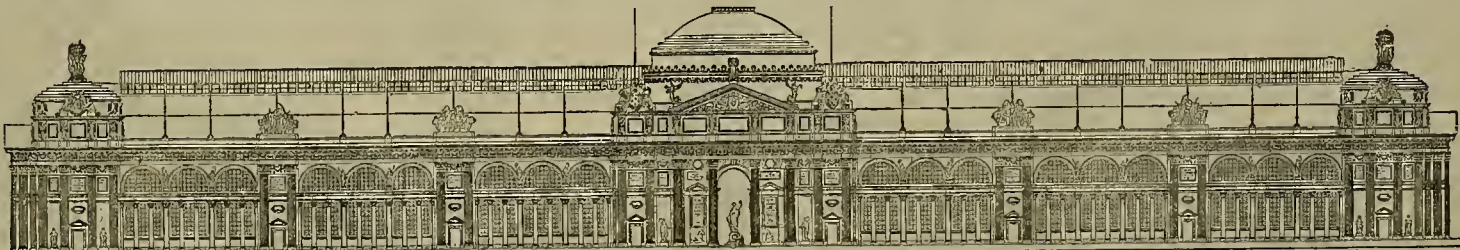
the area reserved for foreign nations and the several States, and east of the women's building and of Midway Plaisance. The Government Building was designed by Architect Win-

a central octagonal dome, 120 feet in diameter and 150 feet high, the floor of which will be kept free from exhibits.

Machinery Hall, on which Peabody & Sterns of Boston, have been working for months, has

the building under cover. A colonnade with a space at either end forms the length between Machinery and Agricultural halls.

The Agricultural Building is to be put up
(Continued on page 593.)



PRINCIPAL FACADE OF AGRICULTURAL BUILDING, WORLD'S COLUMBIAN EXPOSITION.—FROM THE ORIGINAL DRAWING.

A Lixiviation Plant.

The Construction of Details for a Modern One.

[Read by C. A. STREIFELDT, San Francisco, before the American Institute of Mining Engineers.]

A modern lixiviation-plant for the treatment of silver-ores with hyposulphite solution differs so materially from its ancestors, that a critical description of the improvements recently carried out and proposed, will not be without interest to metallurgists. While the general arrangement of such a plant depends upon local circumstances, its details of construction are more or less constant and can be described from a general standpoint.

The plant consists of wooden tanks in which the ore is treated and solutions are accumulated; apparatus for elevating and transferring solutions, and for creating a vacuum below the filters of ore-tanks; filter-presses and drying-chambers for handling precipitates; apparatus for manufacturing sodium sulphide, etc.

1. Wooden Tanks.

Construction.—Tanks should be made of clear, well-seasoned lumber. In the United States, Oregon pine is the best material for this purpose. The staves, from 3 to 4 inches thick, according to size of tank, should be ordered out to sweep of radius, and from 9 to 10 inches longer than the inside depth, but not "gained" for the bottom. The galling of the staves, 1 inch deep, is done by hand, leaving a chine of 6 inches below the bottom. In all tanks the staves stand perpendicular to the bottoms. The bottom pieces, 3 to 4 inches thick, are out to a diameter of 2 inches greater than that of the finished tank; they are grooved and joined by a tongue. All joints must be fitted with precision. White lead should never be put between the staves, but may be used in inserting the tongues between bottom pieces. The under-structures of substantial timbers, placed on a solid foundation, should be sufficiently high to allow access to the bottom in case of leakage. The bottoms rest on joists, 3 to 4 inches wide and 10 to 12 inches deep, placed about 2 feet 6 inches apart, so that the staves are left entirely free. Hoops are made of round iron, $\frac{3}{4}$ to 1 $\frac{1}{2}$ inches diameter, the threaded ends, with hexagonal nuts, passing through forged or cast-iron lugs, giving preference to the former. In order to get the full strength of the rods, the threaded ends are taken $\frac{1}{2}$ inch larger than the diameter of the rod. For tanks of larger diameter, each hoop is made in two or three sections; this is necessary to effect a more uniform closing of the stave-joints by tightening the nuts in two or three places.

After finishing, the tanks are painted on the outside, staves and bottoms, with three coats of white lead.

Dimensions.—Formerly, the dimensions of lixiviation-tanks were taken quite small: Ore-tanks not larger than 12 feet diameter and 3 to 4 feet deep; precipitating-tanks, solution-sumps and storage-tanks of corresponding dimensions. In recent works, however, ore-tanks of 16 to 20 feet diameter and 8 to 9 feet depth, precipitating-tanks, solution-sumps and storage-tanks of 12 feet diameter and 8 to 9 feet depth are put up. As can readily be seen, the care and attention required to finish a charge in an ore-tank, or to precipitate a solution in a precipitating-tank, are independent of the size of the vessel; hence, the great advantages of large sizes.

The capacity of an ore-tank for 24 hours depends upon the specific gravity of the ore, the quantity of first and second wash-water, and of stock-solutions required for treatment, but principally upon the rate of lixiviation. Capacity increases in proportion to diameter, but remains nearly stationary as far as depth is concerned; that is, the same number of ore-tanks will be required whether their depth is 9 feet or only 4 or 5 feet, in order to treat a stipulated quantity of ore per day. In fact, should the rate of lixiviation increase with reduced depth, the same number of shallow tanks would put through in 24 hours more ore than deep ones. The principal advantage of increased depth consists, therefore, only in reducing the number of charges treated.

Sluicing Tailings.—Where water is abundant, tailings are now removed by sluicing, and great depth of the charge is no disadvantage. Even where water is scarce, and tailings have to be removed by hand, deep tanks should be used. It is only necessary to provide mechanical means for moving above the tanks large buckets into which the tailings are shoveled.

Filters for Ore-Tanks.—The false bottoms for the filter, and the latter itself, are prepared as follows: Wooden slats, $\frac{1}{2}$ inches high and 1 inch wide, and separated 1 inch from each other, are fastened to the bottom. This has, so far, been done with iron screws, bedded in white lead; I would suggest pine of hard wood. The inside of the slats, next to the bottom, is cut out in many places, $\frac{3}{4}$ inch deep and 3 inches wide, so that a free passage of the solution below the filter is established. Between the ends of the slats and the staves a clear space, $\frac{1}{2}$ inches wide, is left. A strip of wood, $\frac{1}{2}$ inches high and 1 inch wide, previously cut with a saw in many places, and well soaked in water, so that it will bend easily, is now fastened round the slats, leaving an annular space, $\frac{1}{2}$ inch wide, between the strip and the staves. One thickness of stiff matting, covering the slats and the circular strip, but not the annular space, forms the foundation of the filter-cloth proper. The latter, No. 10 canvas duck, is out to a diameter 6 inches greater than

the inside of the tank, so that the ends can be pressed into the annular space described above, and kept in position by forcing down a $\frac{1}{2}$ -inch rope.

Sluice Gates.—A gate for sluicing tailings is illustrated in the *Trans.*, vol. xv., p. 359. The discharge-opening should be 18 to 20 inches wide and 8 to 9 inches high. The door is covered with a sheet of rubber, and should be suspended by a counter-weight when removed. For very large ore-tanks, say 18 to 20 feet diameter, it is desirable to have two sluice-gates diametrically opposite to each other. The bottom of the gate should be flush with the filter.

Solution Outlets for the Ore-Tanks.—These are made of 2-inch, six-ply, rubber steam-hose, which is inserted in the following way: A piece of clear plank, 3 or 4 inches thick, is fastened to the bottom of the ore-tank with wood-screws, and a hole, having the exact size of the outside diameter of the hose, is bored through the bottom and the plank, at a flat angle of about 30°. Through this hole the hose is forced. All joints are made with thick white lead, the wood screws being also bedded in this material. A pin of hard wood is finally driven through the end of the hose into the wood. If the solution-hose is permanently connected with a Montejus (see 6) for producing a vacuum below the filter, and leaching with water from below the filter is desirable, a second hose should be inserted in the bottom of the tank and connected with the water-pipe. Finally, a third outlet may be provided and connected with a Koerting ejector or a geyser-pump (see 7), if circulation of extra-solution is necessary.

Launders for Solution in front of Ore-Tanks. These launders, 6 inches wide and 8 inches deep, are made of clear $\frac{1}{2}$ -inch lumber, and painted inside and outside with asphalt varnish. They are placed level, and should be held together with properly constructed braces. Connection with precipitating-tanks is made by 3-inch, six-ply rubber hose, which is inserted in the same way as the hose in the bottom of the ore-tanks, but the hole is not bored slanting.

Launders are needed as follows: One for silver-bearing wash-water, one for waste water, one for solution, one for weak solution. If it is desirable to treat ore at different periods with cold and hot solutions, and to keep these solutions in rotation separately, a fifth launder must be added. Launders are either placed a short distance below the ore-tanks (from bottom of staves to top of launders, about 9 inches), and above the precipitating-tanks (about 6 inches from bottom of launders to top of precipitating-tank); or 5 to 6 feet above the top of precipitating-tanks, and below the upper floor round ore-tanks. The first position is taken if no artificial means are used to increase the rate of lixiviation; the second if the rate of lixiviation is increased by a Montejus with vacuum. (See 6.) The high position in the latter case is necessary to give sufficient head to the discharge through the 3-inch hose of the launder; when the solution is suddenly pressed up from the Montejus.

Boxes for Chemicals.—Solutions introduced to the ore-tanks are first conducted to a wooden box or barrel, with holes in the sides, standing on top of the charge. This prevents stirring up of the ore by a strong current of solution. These boxes also receive the copper sulphate and sodium hyposulphite for making extra solution in the ore-tank.

Tail Races.—If tailings are discharged by sluicing, proper attention should be paid to the construction of tail-races. Their inclination depends, of course, on the specific gravity and coarseness of the material; it should never be less than $\frac{1}{4}$ inch to the foot.

Precipitating-Tanks.

Stirrers.—For stirring by hand, an oar of ash; 16 feet long, is used. Mechanical stirrers are however, far superior to hand stirring. The best form of a stirrer is a propeller-screw of about 2 feet diameter, making 120 revolutions per minute. The screw revolves about 1 foot above the bottom of the tank. Since the lower end of the propeller-shaft can not be very well left without a guiding bearing, and at the same time should be protected against the corroding influence of the solution, it is enclosed in a heavy glass tube, held in position by rubber nipples and iron washers. The guiding bearing is made of lignum vitae.

Stirring solutions with air, as described in the catalogues of the Koerting Bros., is very effective. Some trials have recently been made with air stirring at the Maracó mill, but it remains to be seen whether this method decomposes sodium hyposulphite in perceptible quantities or not.

Decanting-Pipes.—The decanting of the clear solution, after precipitation, is done by a swinging two-inch gas-pipe, working through a stuffing-box. An illustration of this arrangement is found in the paper of Mr. Daggett, *Trans.*, xvi., 446. The pipe is marked there four inches, which is too large. When a propeller-stirrer is used, the pipe moving up and down cannot pass through the center of the tank, but must be shifted 18 inches away from it.

Outlet for Precipitates.—Precipitates are discharged by a two-inch asbestos-packed angle-iron, inserted close to the bottom of the tank through the staves.

Launders.—In front of the precipitating-tanks are launders, leading the decanted solution to the solution-sumps, and running de-

canted wash-water or weak solution to waste. If cold and hot solutions are kept in rotation separately, two launders must be placed in front of the silver precipitating-tanks, one leading to the sump for cold, the other to that for hot solution. The launders at the back, conveying precipitates to the storage-tanks for sulphides, wash-water precipitate and lead carbonate, should be inclined, with a fall of about 4 feet in 100 feet. These launders are constructed in the same way as those in front of the ore-tanks, but need not be so large.

Storage-Tanks for Precipitates.

These are made about 10 feet in diameter and 3 feet deep. A 2-inch rubber hose forms the outlet for precipitates through the bottom. A 1-inch decanting-pipe for solution is inserted through the staves about one foot above the bottom. Both outlets are connected with the press-tank.

Solution-Sumps and Storage-Tanks.

These should be made of the same diameter as the precipitating-tanks, but about one foot less in depth. Two of each kind should be provided, especially where solutions are heated, and hot and cold solutions are kept in rotation separately.

2. Precipitating-Tanks for Wash-Water.

If it is desirable to precipitate silver and copper from the wash-water by scrap-iron and sulphuric acid, the process is best conducted in the apparatus described and illustrated in my book, "The Lixiviation of Silver Ores," page 159.

3. Sodium-Sulphide Tanks.

The sodium-sulphide mixing-tank is made of cast-iron, 3 feet diameter and 7 feet deep. Its great depth is necessary because the concentrated lye foams considerably while adding the sulphur. The bottom is covered one inch deep with lead, to prevent its wearing out where steam is admitted for heating the lye. The two sodium-sulphide storage tanks, receiving the diluted solution, are made of 3-16 inch boiler iron, about 6 feet in diameter and 5 feet deep. All the tanks are provided with $\frac{1}{2}$ -inch asbestos-packed cocks. It may be desirable to increase the contents of sodium hyposulphite in the solution by rapid oxidation. For this purpose a gas-pipe coil, perforated by numerous small holes, is placed on the bottom of the tank and connected with an air-compressor. The air is then forced in small bubbles through the solution. Material and size of tanks for Solvay soda solution are not of importance.

4. Apparatus for Heating the Stock-Solution.

Apparatus for heating stock solution can be placed either in the solution-sumps or in the storage-tanks, depending on the most convenient location of the boilers. Coils of lead pipe, through which steam is conducted, are very effective, but, unfortunately, not sufficiently durable to warrant their cost. Although lead is not attacked by a pure hyposulphite solution, the stock-solution contains sulphates and chlorides, and these may form lead sulphate and chloride, both soluble in hyposulphite salts. Besides, we have to consider that the stock solution is never entirely free from silver and copper.

At the Maracó mill heavy cast-iron pipes one foot in diameter have been substituted for lead coils with satisfactory results regarding durability and cost.

I suggest giving to these heaters the shape of large, round, hollow disks, for a more economical utilization of steam.

Either heaters should be provided with steam-traps, or the escaping condensed water and steam should be conducted to the feed-water tank for the boilers.

(To be Continued.)

GOLD IN NEVADA.—The Belmont *Courier* says: Many discoveries of gold ore and gold dust have recently been made in various parts of the State of Nevada. The gold mines in the counties of Humboldt, Douglas, Esmeralda and White Pine are reported as looking splendid. The quartz found in the southern portion of Nye county carries considerable gold, and if capitalists take hold, the mines there will be made to yield yellow metal in good quantities. The Carson *Appeal* says the following regarding the latest discovery of gold ore made in this State: "The big strike recently made by W. Zern, in the Pine Nut district, is richer than first reported. Some of the ore has been brought down, and is filled with chunks of free gold."

The West End Oil Co. has already struck oil in the 16-inch well west of the city limits of Los Angeles, and pumping machinery is being put in. The well is only down 175 feet. If necessary, it will be sunk deeper, the company having the facilities to sink it 3000 feet. It is also reported that another well in the same vicinity is flowing 40 barrels a day.

The following directors and officers have been elected by the Homestake Mining Company: Louis T. Haggin, President; Lloyd Tevis, Vice-President; I. C. Stump, J. B. Haggin and Geo. J. Henry, Directors. The usual dividend of 10 cents per share, aggregating \$12,500, was declared payable June 25th. This is the one hundred and fifty-fifth consecutive dividend paid by this company.

Hydraulic Mining.

A Plea for an Extinct Industry.

A correspondent of the *Paeon Herald* writes as follows on the subject of the results of the hydraulic mining contest and the desirability of debris dams:—Our county papers are full of horticultural and agricultural talk, but nothing much seems to be said about mining, especially hydraulic. Without desiring to occupy much of your space, I wish to call the attention of our people to a question which it seems to me should be thoroughly agitated before the next session of Congress. Ever since the insane decision of Judge Sawyer, hydraulic mining has gradually died out, until to-day it is an extinct industry. Every one concedes that with the closing of the mines has come harder times all over the State. The effect is being felt in the cities especially. We all know and realize the fact that if the mines could again be worked, business would be better all over the State. This feeling has been growing for the past few years, since the close times incident to closing the mines have so forcibly taught the lesson. Even Governor Markham has called the attention of the President to this important subject. Yet the people whose very prosperity and happiness depend on the rehabilitation of hydraulic mining are inactive, plethoric. They all desire to see hydraulic mining resumed, and so resumed that it will not injure the farmers. That this is possible, is evident from the report of the able corps of engineers selected to make a survey and report on this question. That dams can be built to successfully restrain the debris, the engineers say is entirely practical. This the miners have always maintained, and would have accomplished years ago when they were able to, had they then been permitted to do so. They have always been willing to meet the farmers half way, and do what is just and equitable, but the farmers had the upper hand and used it without once considering the rights of their fellow citizens, the miners. Had the miners been traitors to the government, had they been attempting to destroy our institutions and steal from the people their liberties, they could have been treated no worse by the farmers. Through the leadership of a few fanatics, the farmers were led to regard the miners as outlaws who intended the destruction of their property. They fought the miners bitterly, they conceded them no rights, they never thought of the ruin, desolation, and misery the accomplishment of their ends entailed on one of the fairest portions of our State. We might expect such action from a semi-barbarous nation bent on conquering and destroying another, but for the citizens of one portion of a State, who love the same flag, who cherish the same traditions, who believe in the same principles of truth, justice and the equal rights of man, is deplorable indeed. Especially is this true when a different and more equitable solution was attainable.

Little did the founders of our constitution dream when they inserted in the preamble of our constitution, the phrase, "to establish justice, and to secure the blessings of liberty to ourselves and posterity," that the time would come so soon in the history of the government, that that very government itself would become the instrument of denying justice and liberty to a section of country larger than four of the States which then formed part of the original thirteen. Little did they think that that very government would be the means of inflicting a greater wrong on a portion of its people, than many for which they fought England twice, and on a class of its citizens too, than whom none were more generous, open hearted or liberty loving; than whom none had done more to sustain that very government in its hour of peril and need, simply because the miners, engaged in an industry for the purpose of gaining a living, which to a certain extent conflicted with and injured a small portion of the State, which injury they had not intended, and which they were willing to do all they could to avoid, they were prosecuted, by means of the very government which they dearly loved, which they had stoutly defended and generously maintained. Spies were sent among them to watch them, for what purpose? To ascertain whether they were plotting and scheming against the rights of others, whether they were endeavoring to destroy the government? Oh no! only to see whether they were earning a living, that they might support their families and rear their sons and daughters that they might become good American citizens. And because they did this, the government which had sold them their property was used as the means of denying them this right, and so of despoiling their homes, destroying their property and inflicting unold misery upon them. And if they insisted on earning a living they were cast into prison. Was a greater injustice ever done to a quiet, peaceful class of American citizens? This is not overdrawn, for I have seen men who fought to preserve the Union, who shed their blood for its defense, have their property which it had taken 20 years of toil to develop or accumulate, rendered valueless. I have seen them go to their graves, poverty stricken and bowed down by the rank injustice done them, without giving them even a fair trial. I have seen happy homes broken up, and the members scattered to the four winds like the Acadians in 1755. Of course they were not compelled to go at the point of the bayonet, but starvation is as effective as the

sword. I have seen men once prosperous and happy, driven insane, by the sudden change to penury. I can see about me to-day old men and women, who began in youth, when no thoughts of injunctions or imprisonment menaced them, if they wished to mine, to toil and accumulate mining property, expecting that it would support them in old age, I can see them to-day toiling, striving for a mere existence, because their property is of no value.

I believe these are all unnecessary, and for that I believe the folly of the farmers approaches a crime. Had they been reasonable, and had they given the propositions of the miners a fair trial, the mines might be running to-day and all this ruin and misery averted. It is not yet too late to try dams. It has been proven to be feasible. The commissioners report it so, but they say the miners should build the dams. This is unreasonable because hydraulic mining property is of no value, capital has been driven away from it and other kinds of mining can go on without dams. The Government owes it to the miners to build these dams for them. The Government sold them the property in good faith, and then it said they could not use it, so made the property valueless, and consequently the miners are not able to build the dams. If the Government can afford to pay \$300,000 for the lives of a few Mongolians, or if it could afford \$7,000,000 for Alaska, certainly it can afford even a million of dollars to make reparation for the injury it has inflicted on a large portion of one of its most promising States. This question should be agitated. The miners should organize and see that their claims are presented to Congress, that their rights be given which belong to them. If the Government sanctions and assists in building dams, certainly such an insane decree as Judge Sawyer's cannot be enforced. Let us demand our rights and strive to obtain them. Let the farmers join with the miners in giving the dams a fair trial, then if unsuccessful let them close the mines and have the government indemnify the miners for their property.

A Four Months Prospect.

The *White Pine News* says: B. B. Bird and Sam Snyder of Taylor arrived here Wednesday from a four months prospecting tour to the southern country. They left Taylor last January well equipped for the tour, and proceeded south by way of Pioche, down Pabranagat Valley, diverging west to the Pah Rump country; thence west to Death Valley. They were at Camp Montgomery and the much talked of Breyfogle mine. That country they represent as very tough for both man and beast, water being very scarce, and what little there is of a bad quality. They tell us that the long looked-for Breyfogle mine has been found, and that all it yielded its second discoverer was about \$500, which he took out in a few days, when the mine "pettered." Sometimes they traveled from 200 to 300 miles through the country without seeing a human face. From Death Valley they steered west through southern Inyo county to Mohave, Cal. Here they changed their course, traveling north until they reached the head waters of Kern river, where Mr. Bird had mined many years ago, and where he still believes there are paying placers as well as ledges. He found, however, but very few men mining in that country and the mines stood just as he had left them twenty years ago. It was not until the return trip that any sign of winter weather was encountered, when they experienced a good deal of rain and badly washed roads. Messrs Bird and Snyder traveled over 1,200 miles, and they say that in all that country they have seen and prospected, none of it compares favorably either as a mineral or agricultural country with White Pine county. So they came back to pitch their tent for good.

THE ANACONDA CO.—The *Engineering and Mining Journal* says: We are reliably informed that the great Anaconda sale is going through. The debenture and preference shares have all been "underwritten," and only the £1,000,000 of common stock is to be put on the market simultaneously in London, Paris, Berlin and New York. The Anaconda matte in England is all sold, 5000 tons about two weeks ago on a basis G. M. B. and G. M. O. over three months, and the other 5000 tons a week ago; delivery extending over a year on the same basis. As the remainder of the stock is held by friends of the new Anaconda Co., and the mine is shut down, the market price of copper must improve. The prospectus is ready, but it may be September before the money market looks sufficiently auspicious to launch the new concern. The recent drop in copper on the Exchange in London was due to the belief that the object of Mr. Livermore's visit to Europe was to place a large line of Lake. There seems to be a very erroneous impression abroad about the stocks of copper in the United States. They are, in fact, lighter than on the first of the year, and are not likely to increase. The outlook for copper appears to us to be good, and higher prices may rule at no distant date.

THERE are 16 gas wells in active operation in Stockton, and the supply seems to increase rather than diminish. It is copied at 25 cents a thousand feet, and for manufacturing purposes nothing can beat it. It has given a great impetus to manufacturing, and the result is that Stockton has a great boom.

Electrical Chlorination.

The first practical demonstration of the extraction of gold by means of chlorine, is due to the late Professor Plattner, upon whose discovery all subsequent improvements are based. The most noteworthy modifications and improvements are those of Calvert, Jackson and Ott, Mears, Deeken, Patra, Reesner, Henck, Newberry and others of less note. The introduction of electricity in the extraction of gold is of more recent date, and the leading names of those who first adopted this method are Plober, Ansel and Marle, and Cassel. The latter patent was approved by capable authorities, but although five years have now passed, Cassel's process has not forged its way to the front.

Mr. Th. Ranft, M.E., of Sydney, says the *Australian Mining Standard*, now introduces an electric-chlorination process, in which he claims to have overcome the vital defects before experienced in electrical chlorination, viz., the getting rid of the sequent hydrogen and sodium as they are formed by the electric current when passing through the electrolyte. In all processes where the hydrogen cannot be kept separate from the chlorine gas, the two will combine and form hydrochloric acid, which combination does not solve gold and is in every way most injurious to the process. The inventor does not claim or patent any new law, but an apparatus by means of which the laws observed are complied with. The apparatus consists of two cylinders, one within the other. The inner cylinder, made of a porous material, serves four functions, viz., 1st, as a filter, 2d, as the negative pole or cathode; 3d, it acts as a burr to allow the precipitated gold to escape along with the caustic soda, and lastly it allows the formed hydrogen gas to escape at the top. The outer cylinder, which is air tight (except at the places where it is required periodically to discharge) serves three purposes; firstly, it forms the positive pole or anode of the battery; next, it acts as a chlorine gas generator and store, and lastly, as the chlorinating vessel.

The process performed in the apparatus is as follows: The ore to be treated (free of sulphur, arsenic, lead, zinc or bismuth) is mixed in certain proportions with common salt. It is then fed into the outer chamber, where the anode is, and the electric currents enter. Water is then added, which dissolves the salt in the ore, and this combined with the saline liquor, forms the electrolyte. An electric current from a dynamo it then led into it by the anode, and passing through the solution into the inner chamber or cathode, is discharged back to the dynamo. The chemical actions produced by the passage of the electricity is to decompose the electrolyte into its elements. Hydrogen and oxygen are the products of water, chlorine and sodium those of salt. Hydrogen, being a positive substance, deposits on the negative pole; oxygen, on the other hand, being negative, deposits on the positive pole. Chlorine and sodium deposit respectively on the positive and negative poles. In order to prevent the accumulation of oxygen and hydrogen, contrivances are provided, which continually wash the surfaces of the anodes to prevent polarization, which would stop the whole process. With regard to chlorine, it has been established by Begerel that chlorine in its nascent state is more active than afterward, so that if in the ore under treatment any gold is present, it would now be almost readily attacked by the chlorine and form itself into chloride of gold (salt of gold) which again is soluble in water.

The gold being now in solution is readily acted upon by the electric current. The molecules, as established by Grothus, 1805, are under the same condition as any other molecules, which in their transit to the negative zone become split up into their elements, the chlorine parting and returning to the positive zone, while the gold is deposited on the negative pole in a fine metallic condition in the inner chamber. From this it is washed and drawn off in the contracted part of the inner chamber, in conjunction with the caustic soda, and passed through a filter. The powder is then calcined, and the gold remasses.

The gold having been extracted from the ore, the latter is drawn off at the bottom of the outer cell, and an equal amount entering simultaneously at the top from a hopper, in which it has been mixed with the salt, makes the action continuous. In a working plant, every ton of ore will be virtually from 20 to 24 hours under the chlorinating and electrical influence, and travel about 20 feet, which will give sufficient time for effective treatment.

As to the cost, it is estimated to be about one-ninth of the present cost of chlorination, or that three shillings five pence per ton should cover the cost of supervision and sinking fund for capital. The inventor estimates the outlay for a complete plant to be £250, exclusive of an engine to drive the dynamo.

A NEW HIGH EXPLOSIVE.—The ordnance experts have been invited to test another high explosive, the inventors of which claim for it all the desired qualities, that is, perfect safety in handling it by yourself and exterminating destructiveness on your enemy. The explosive in the present instance has the patriotic name of Americanite, and is manufactured over in Virginia. Americanite is said to be capable of explosion by a gunpowder fuse, when strongly confined, and can be detonated without the use of a fulminate, a feature of peculiar value for ordnance purposes.

Free Coinage of Silver.

The fight now on for free coinage is nothing more than a fight between capital and labor. Labor is demanding free coinage, which is inimical to capital, and is as much an irrepressible conflict as was that between freedom and slavery.

The Grange has demanded the free coinage of silver through its representatives in the National Grange. All farmer and labor organizations of any importance have demanded free coinage, and yet with all the resolutions and demands that labor could make on the present Congress, the bill for free coinage was defeated. The same crowd of financial wreckers that were instrumental in having silver demonetized in 1873-74 are to-day fighting free coinage.

In demanding free coinage, labor is asking for but very little more than the restoration of silver to the position it occupied before. The bill for the demonetization of silver was sneaked through Congress by men who, if they had their just deserts, would be spending their time in a State prison instead of in Congress, where some of them are to-day still the champions of organized capital.

The opponents of free coinage are working and depending upon the forgetfulness and ignorance of the people to carry their point.

The chief arguments of capitalists and their willing tools in Congress are, that free coinage will drive gold out of the country; the same argument was used prior to the Act of Feb. 28, 1887, as an inevitable result of a limited coinage of silver of \$20,000,000 per month.

Pass that bill said the gold bugs of Wall street, and you will drive gold out of the country; they are raising the same cry now. But did it drive gold out, as they were sure it would?

No; but instead of having \$167,000,000 of gold coinage in the U. S., it has increased until we now have \$662,000,000.

That is how limited coinage drove gold out of the country from 1887 to '90. What reason have the anti-coinage men to base their predictions on only the forgetfulness or ignorance of the people? History has proven them to be false prophets and they should be stoned out of their position by the ballots of an outraged people.

We tried free coinage in this country for more than 80 years from 1792 to 1873. We had free coinage and found it a safe financial policy. Upon that policy we built a great and prosperous nation and carried on one of the greatest wars in modern times; all industries grew together, each one retaining a just reward for its labor; the equilibrium of each industry was maintained, strikes among laborers practically unknown, trusts and combinations to oppress were wholly unknown.

But there is another objection brought against free coinage equally as absurd, and when investigated shows that the authors of the objections are either ignorant of the facts or else they take the people to be fools.

Wall street money bags, etc., are predicting a terrible calamity in shape of an influx of foreign silver, should free coinage be adopted.

France has 3,250,000,000 francs in silver, which is worth in her jurisdiction \$644,695,000 in gold, 15.50 to 1.

Suppose America should adopt free coinage and France should want to wreak vengeance upon us by sending her silver here and flooding our markets, as some would-be statesmen would try to make us believe, how would she succeed?

We said she had 3,250,000,000 francs; if sent here and coined at our mints at our ratio of 15.50 to 1 here, 3,250,000,000 would be worth \$627,250,000, a clear loss to her of nearly \$20,000,000.

Spain, Belgium, Italy and Switzerland, which coin at the same ratio, would sustain corresponding losses on their silver.

India coins at 15 to 1, has stock of silver worth at home \$1,352,000,000, and worth at our ratio \$1,269,000,000, will she flood us with cheap silver and lose by so doing \$83,000,000? That would be a money-making scheme throughout. Where are those large importations of silver to come from that threaten to engulf us? Only from the imaginative brain of Wall street tools.

The chief among them stands John Sherman who seems to have been the leader in smuggling through Congress the infamous bill, which practically etopped the coinage of silver; and when in '87 the limited coinage act was passed, Sherman advised President Hayes to veto the bill, 'tis said. Sherman is said to be a great financier, but his financiering has always been in the interest of Wall street as against the people; and in the fight now for free coinage he is as true to Wall street as the needle to the pole. But, says Wall street, a silver dollar is only worth 72 cents. Admitting that, it is only technically so and has been made so by restrictions placed upon it; remove the restrictions and the silver dollar will be all right. What does the farmer or laboring man care for technicalities, so a silver dollar will buy 100 cents worth of produce or pay 100 cents worth of debts. The truth of the matter is, the laboring classes would be thankful if they only had plenty of good, old, silver dollars, and they propose to have them.

The people are aroused upon this money question and are beginning to see through the hellish schemes of Wall street money sharks, who were instrumental in destroying the greenback and saddling millions upon millions of dollars of debts upon the people for labor to pay. Not con-

tent with the destruction of the peoples money, they demonetize silver (by a dirty trick) thereby destroying millions of dollars of property at one fell swoop, bringing bankruptcy and ruin on thousands of innocent men and women; and when people demand relief by free coinage the plant tools of Wall street say, 'twill drive out gold, 'twill flood us with silver from other nations, etc. Pah! Let her flood.—*Am. Grange Bulletin.*

Spoiling a Mining Deal.

The *Idaho Avalanche* says: Quite an important mining deal was on the eve of being closed here a few days ago, which would, in all probability, have increased the output of bullion and the business of the camp very materially, but just on the eve of the consummation of the trade, a man who had an old grudge against some of the parties in the deal, got to the ear of one of the purchasers, and, by telling what many here know to be most willful falsehood, stopped, or at least delayed, the deal. The man who did this is trying to dispose of a mining property himself, and when parties come to inquire into its merits, the other fellow will have his revenge, and will bring every influence he can bear to prevent a trade. Thus matters go in this camp, and thus they have been going for many years. Many of the people have been here so long, and this practice of venting personal malice has been so long in vogue, that there is scarcely a property owner in the camp wishing to make a sale, who will not find some one ready to give the property a bad name. We have known of several recent instances of capital being frightened away from here by this out-each-other's-throat idiosyncrasy. Any man with a grain of sense ought to see that mining is in no way a competing industry, and every disparaging remark about a neighboring property, indirectly injures the entire industry. The owners of the De Lamar mines would be in no way the losers if any of the adjoining properties should turn out to be even greater than theirs. If A succeeds in disposing of his property, his neighbor B stands all the better show of finding a customer for his, provided A has not swindled the purchaser. But here, if A finds a buyer, B will try to spoil the deal by saying disparaging things about A's property, in the hope that the buyer can be induced to take his instead. By this means the buyer is frightened away and neither make a sale. It is time to stop this kind of idiotic procedure. This country is full of good mining properties, the greater number of which belong to persons who have not means enough to develop or work them. The majority of such owners are willing to sell at reasonable prices, and no one of them ever improves his chances by preventing the sale of his neighbor's property.

The State Fair.

We can but remind our readers that an important matter in connection with the State Fair at Sacramento is the liberal premiums offered now as farm produce premiums. There is no doubt these individual premiums will be an incentive to farmers all over the State to join in making their county exhibits, and have their products in the county exhibit for a premium, and also an individual premium "for the most extensive and varied exhibit of farm produce grown by one person or firm;" first premium, \$350; second, \$150. It is hoped that liberal premiums offered for farm produce will induce producers throughout the State to take advantage of it, and make this fair notable in the lines of farm produce, uniting the products of the State with the blooded stock of the State. The management has this year decided upon a new feature, and that is to increase the race meeting from nine to eleven days, six trotting and five running. The increase from a nine days' to an eleven days' meeting will be watched with much interest. Purse and stakes aggregating nearly \$50,000 will be offered in that time.

There seems to be a wide disposition to make the State Fair to be held this year one of the most successful in the history of our State. The extra appropriation made by the last Legislature, and the liberal premiums offered the counties and individuals for farm exhibits, meet with wide commendation. A Press reporter called on Secretary Edwin F. Smith last week, and learned that there had been more applications by exhibitors up to date than for any previous year.

He noticed a full force of men working on the pavilion, renovating and putting it in shape for the coming fair. In anticipation of a large following this year, the Board of Directors have concluded to make several additional improvements, and the prospective success will warrant some additional attractions for those who wish to spend a holiday at the coming fair.

FREE COINAGE.—The meeting of the Free Coinage Silver Committee, which was to have been held in Washington, on the 18th, will be held at New York instead. The proposition for a compromise on the coinage of products of American mines is not regarded favorably by the committee, who want free coinage in the fullest sense of the term. Senator Stewart said to a reporter to-day that he was confident that a free coinage bill could be passed through the next Congress and over the President's veto.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

BAY STATE.—Cor. *Amador Ledger*, June 13: The picnic at the Bay State mine on Thursday last passed off in the most pleasant manner. The ceremony of naming the mine was performed in grand style. At the appointed time two fair shareholders, Miss Carrie Easton and Miss Belle Summers stepped forward. One of them seizing a pick plied it with right good will, until quite a lot of rock and dirt were loosened up, when the other young lady threw out the dirt. After working in this way until they had formed the mouth of the new shaft that is to be, they retired from their labors and the ceremony of baptizing the mine and giving it a name was done by Miss Geneva Jones, daughter of W. T. Jones, by naming it the Bay State Mining and Milling Company, Limited, and breaking a bottle of champagne over the point of a pick. Hon. John A. Eagon delivered a very interesting discourse over the great wealth of this section as a gold-producing part of the county. Mr. Parks of the Kennedy mine gave the location a very careful examination and seemed to have a very favorable opinion of the property, which gives great courage to the shareholders, as Mr. Parks is known as one of the most successful miners in the State and has been instrumental in making the Kennedy mine one of the best dividend paying mines in the State. W. T. Jones is another of the directors of the Bay State Co., and is well known throughout the State as a successful miner, foreman and present superintendent of the Plymouth Consolidated, a man that never owned a foot of mining ground in the county before, but is at present interested in the Bay State to about 34,000 shares, and expresses great confidence in the outcome. Arthur Young, another director from Placerville was well pleased with the location. There was also present directors W. A. Green, L. G. Norris, A. J. Crain, Mr. Brown, superintendent of the Great Eastern, and a very successful mine boss in Nevada, Arizona, and California, also Morris Brinn of Sutter Creek, who has had large experience on the mining belt. Thos. Morris, an old mine foreman and miner in this State and Pennsylvania, and hosts of miners from all parts of the county. The general verdict is that the location and present prospects are good. The rock yielded \$3.74 at 50 feet deep, and getting better as it went deeper. The sinking will be made in the foot wall, to avoid water, and a crosscut will be run at 300 feet deep, when it is expected that the rock will go \$8 per ton. The estimate is that it will take about eight months to sink and crosscut the ledge.

KENNEDY.—*Amador Ledger*, June 13: Mr. Barton, the president of the company, also Mr. Judson and F. Reichling came up Sunday evening on business pertaining to the mine. One of the reasons of their visit was in relation to the sulphur works. The sulphur, while carrying a large percentage of gold, are heavily charged with arsenic, which renders the smoke and fumes very obnoxious. The fine that is designed to carry off the smoke is defective, and the smoke consequently is troublesome to persons in the vicinity. It is the intention to thoroughly remedy the evil either by building a regular brick flues to the top of the hill to carry the fumes high enough to obviate the difficulty or by some other effectual method. Everything in connection with the mine is looking well. Sinking operations at the south shaft are progressing favorably. The ore body on the lowest level is opening up grandly, and is as far above the rock encountered in the level above, as that level was an improvement upon its predecessor. If in sinking another 100 feet the improvement in quality and size of the ledge should continue, and there is every reason to believe it will—it will insure a career of prosperity for this leading mine of Amador Co. for many years to come.

NORTH STAR IMPROVEMENT CO.—At the annual meeting of the North Star Improvement Co. the financial statement for the past year ending June 1st, 1891, was presented. The shaft was sunk 128 feet (making a total sinking of 1030 feet) with 599 feet of drifts and crosscuts. All developments so far have given the company but little encouragement. Indications show better at 600-foot level, south. Therefore the directors decided to obtain a lease of the adjoining claim, Comet, south, and continue explorations south at 600-foot level. Also obtained new agreement, with original North Star owners for an extension for five years, to June 1st, 1895. The company became endowed with new life and vigor, still hopeful of meeting success. The old board of directors was re-elected as follows: E. C. Voorheis, president; H. H. Towns, treasurer; R. C. Downs, H. Rees, J. L. Mayon, secretary.

El Dorado.

ROLLER MILL.—*Georgetown Gazette*, June 11: The Centrifugal roller mill at the Sailor Jack mine was put in operation on the 21st of May and has been grinding 12 hours a day since that time. County Clerk Bosquit informs us that everything is working nicely and that the mill is a great success on the soft rock now being taken from the mine. A Woodbury concentrator is also in operation and has saved about a ton of sulphurets from the ore. Ten tons of quartz are being crushed every 12 hours.

GRAVEL CLAIM.—*Mt. Democrat*, June 13: Johnny Davey, who recently purchased an interest in the Larsen gravel claim, near the Six Mile House was in town during the week, and seems to be well satisfied with his bargain. He had with him a medium-sized vial filled with coarse gold, the pieces varying in size, and valued at \$65, which was sufficient evidence that he has good reason to be pleased with his purchase.

Inyo.

SALINE.—*Register*, June 11: J. H. Stoutenborough came up from Saline valley a few days ago. Works, equal in size to those of Conn & Trudo, are being put up, on the north side of the marsh, about four miles from Conn & Trudo's. With Mr. S. are interested Messrs. Roberts, Brockman, Lent and Millner. Though that country is barren and hot, good water is obtained within a few feet of the surface, and wood is conveniently near.

Nevada.

WEST HARMONY GRAVEL MINE.—*Herald*, June 10: The West Harmony gravel mine is a busy place now. The work of development, both above ground and below, is being pushed as fast as men and money can do it. The incline is now down about 270 feet. It is a two-compartment shaft and is in hard blasting ground. It is a fine shaft. The hoisting works is as fine a building as was ever erected over a mine. It was put up to stay and is built in a most substantial manner. Steam-power is being used for hoisting at present, but the frame for a large Pelton water-wheel is being set up and as soon as the South Yuba Co.'s new ditch is completed water-power will be used. The West Harmony people propose to crush their gravel, and a mill will be built on the west side of the hoisting works. The mine is situated on a very steep hillside and the company has paid out a great deal for the construction and repairing of roads. They have spent considerable in repairing the county's road up that way, also. Hon. B. J. Watson is personally superintending the work and he may well feel proud of it.

PEABODY MINE.—*Grass Valley Union*, June 12: The new shaft in the Peabody mine has reached the lower level run from the old shaft and is now being continued down on the vein into new ground. The new shaft strikes the vein on the pay shoot, which yields fine milling ore. The vein is several feet in width. As the shaft is sunk the water will be pumped up to the present lower level and run to the sump at the bottom of the old shaft and from thence pumped to the surface by water-power. A 10-inch pump will be used in the new shaft, which is expected to be of sufficient capacity to handle all the water that will be encountered for some time to come.

CALIFORNIA MINE.—*Grass Valley Union*, June 17: The vein in the north drift of the California mine (Deadman's Flat) is now showing a width from 12 to 15 inches. The quartz is a ribbon rock, bandstone in appearance, and is showing well in free gold. The point at which this rock is found is 70 feet deeper than any previous working done in the mine. The prospects for the California may well be considered as very encouraging.

WASHINGTON.—*Nevada Transcript*, June 11: At the Washington mine, Ormonde, for the last 20 feet the 400 level has been in a chute of ore from three to four feet wide yielding at the rate of \$80 per ton. As the drift has advanced the chute has steadily improved.

CENTENNIAL DRIFT.—*Tidings*, June 12: It has been about conclusively established that the latest strike of gravel in the Centennial drift mine, this county, is of the genuine blue gravel lead. The gravel will pay handsomely. Comstock parties own the Centennial and have spent considerable money on it.

Plumas.

NEW MANAGER.—*Greenville Bulletin*, June 10: The Little Jamison mine has a new manager, Mr. Cheney, who will push development work as fast as possible. Much will be done at this mine this summer in the way of development and improvements. The prospects of the mine are very flattering. Reports have been in circulation that the Plumas Eureka has been discharging men, thus reducing their force. Mr. Cornell informs us that the report is a mistake; that, on the contrary about 20 more hands have been employed during the past ten days. Very flattering results are reported from the mine owned by Supervisor Thompson, situated near Quincy. The work of sinking the shaft in the Crescent mine continues, and with good success. The progress made is as good as can be expected. Abe Bunnell informs the *Bulletin* that the mining outlook on the North Fork, is much better this year than last, and that considerable money is being taken out. The owners of the Shenandoah mine, at French Ravine are pushing work this spring. A ten-stamp mill will be erected as soon as possible. In development work and the necessary preparations for the crushing of ore, considerable money will be spent this summer.

San Diego.

THE SILVER STRIKE.—*Julian Sentinel*, June 11: Several parties who left for the desert last week have returned and others are on the way. They come straggling in tired, hungry and disgusted. Some brought samples of the ore and had them assayed at Stonewall, but did not get satisfactory results. The latest reports are not very encouraging to say the least.

STILL ANOTHER.—For the past two weeks reports of a rich gold strike somewhere between San Bernardino and Julian have been floating around in the air. The new mine was discovered some two weeks ago by S. A. Sniffen and is owned by W. P. Meredith, Chas. McLoyd, S. A. Sniffen and Wm. Johnson. It has been named the Mountain Queen and is situated about three miles north of the Agua Caliente, some 25 miles north of Julian. Several promising locations have been made by the discoverers and several parties are now prospecting in the neighborhood. The quality of the quartz is entirely different from anything ever seen in this locality and shows free gold in quantities that are not often seen. When the discovery was first made 2½ pounds of the ore was sent to San Diego and a \$5 button was the result. This put the owners, who are poor men, on their mettle, and they at once decided to take out a few tons and have it milled here, this being the nearest point, to ascertain its exact milling value before creating any stir about it. This they have done, the ore having been milled last Sunday by W. O. Havermale. The cleanup showed \$160 for the four tons, or \$40 per ton. The ledge is about a foot in width and the gentlemen have only sunk a prospect hole a few feet. The surrounding territory has been prospected but little, but we are informed that the mineral belt is quite extensive. This find only confirms our oft-repeated assertion that the work of the prospector is by no means finished in this mountain country.

Sierra.

THISTLE.—*Mt. Messenger*, June 13: The prospect drift at the bottom of the Thistle shaft is said to be some six or eight feet above the bedrock, but will immediately be sunk deeper to thoroughly prospect the ground.

GRAVEL.—Supt. Meikle commenced to take out gravel for the new large dump at the Battle Mountain Ex. new tunnel, last Monday, and will begin washing it on completion of the reservoir, near mouth of the tunnel early next week.

TUNNEL.—Arrangements have been effected whereby a tunnel will be driven from the Ante Up

claim in Woodruff creek to tap the Brush creek quartz ledge, which was so rich when worked years ago.

Siskiyou.

SHAFT SINKING.—*Yreka Journal*, June 11: The Yreka Blue Gravel M. Co. has set men to work sinking a double-compartment shaft, 477 feet, at the Horace Knight ranch, now owned by T. D. Burrows, on the Oberlin road, about a mile south of Yreka. It is started about 100 yards north of the wagon-road and will be timbered. So soon as the shaft is low enough down, day and night shifts will be put to work so as to reach gravel as soon as possible. This, it is thought, may be done at a depth of 100 feet or so. Should water interfere with the working, a first-class pump will be brought into service. When the blue gravel is struck side tunnels will be run in from Yreka creek. The company think they have commenced at the right place to reach the main blue gravel channel running through Siskiyou county. Chas. Jordan, an experienced miner, is to superintend the work.

QUICKSILVER.—*Siskiyou Telegram*, June 11: I have it from good authority that there is to be a wagon road built from somewhere near Cole's station to the quicksilver mines on Beaver creek; that the company will put up furnaces at the mine, besides numerous other improvements. The road will open up quite a mining camp, and a large amount of valuable timber land; also good mineral springs. There is already a crowd of men working in the quicksilver mine, and they are undoubtedly good miners if properly worked.

Trinity.

CANON CREEK MINES.—*Trinity Journal*, June 13: The mines on Canon Creek are looking as well as usual and the output of hulkion is as good as it has been at any time since the camp started. The Chloride Mining Co., have struck their ledge in tunnel No. 2, which they have been running to tap the ledge at a greater depth, and the ore looks very well. It is about a two foot vein and of good grade and shows indications of going down to a great depth. As soon as the mine is well open on this level another tunnel will be started to tap the ledge 100 feet deeper. The Bailey Co. is getting out rock to be crushed at Chloride mill in order to get a good mill test of the ore; they will probably have 100 tons or more crushed. They are now drifting on the ledge and it bids fair to give them a handsome profit on the crushing. The Buck's Ranch Co., have their mill shut down for a few days while they make some changes in the track from the mine to the mill. Their ledge looks about as usual, so we are informed. Mr. Shattuck has put in an amalgamating pan that will save much of the fine gold that they think they have been losing. W. J. Grigsby informs us that he has discovered another ledge a little above and south of Little East Fork. He says it is about a foot vein and is high-grade rock.

NEVADA

Washoe District.

BEST.—*Virginia Enterprise*, June 13: An entirely new find in this mine is making the new owners feel comfortable in their venture.

YELLOW JACKET.—Shipping 100 tons of gold-bearing rock daily to the Santiago mill, and about 40 tons of mixed ore to the Brunswick. The gold rock assays about \$7 a ton, and the gold and silver ore about \$18 a ton.

JUSTICE.—There has been no work done in the face of the 822 level north drift since last report, as the time has been occupied in putting in a chute and timbering the north winze where the connection was made with the drift. Are stopping ore of fair quality 30 feet back from face of north drift. The 675 and 722 stopes on the south end of the mine are looking well. Shipped 167 tons and 585 pounds of ore to the mill, worth \$23.89 a ton as per battery assays.

SEG. BELCHER.—On the 600 level the west crosscut from the south lateral drift is out 120 feet. The face is in a mixture of soft porphyry and clay.

KENTUCK CON.—The south lateral drift from the 1000 level east raise was advanced 13 feet; face in low-grade quartz on the average but containing spots of ore. The raise from the north crosscut on this level has been advanced seven feet, and is up 63 feet above the track floor; top in low-grade quartz. The raise from the south lateral drift on the 950 level is up 15 feet; top is in low-grade quartz containing occasional bunches of ore.

CHALLENGE CON.—The joint Confidence and Challenge west crosscut on the 200 level is out 12 feet, having been started during the week; the face shows quartz. Joint Confidence and Challenge east crosscut from the north drift on the 1100 level is out 22 feet, having been commenced during the week; the face is in porphyry. Joint Confidence and Challenge east crosscut on the 1000 level is out 12 feet, having been commenced during the week; face shows porphyry.

CON. IMPERIAL.—We are still following up and taking out small streaks of ore on the upper levels and prospecting in and around the old stopes, where we find some fillings and bunches of ore of fair grade.

CROWN POINT.—The east crosscut from the south end of the 350 stope on the eighth floor has been stopped. Have started the main south lateral drift which has been run on the 300 level to and connected with the 400 raise. It is out 12 feet and the face is in porphyry. Are engaged in cleaning and repairing the 500 west crosscut preparatory to resuming work there. The east crosscut from the 1000 level, south lateral drift has been extended 13 feet since last report, and is now out a total distance of 162 feet. The face is in porphyry.

BELCHER.—Have started a west crosscut from the south drift from No. 2 crosscut, 200 level, equal to a distance of about 160 feet from the shaft. It is in 12 feet and the face is in a mixture of porphyry, clay and quartz of low grade. The north drift from the main west crosscut from the shaft, has been extended 33 feet and is out a total distance of 51 feet; face is in a mixture of low-grade quartz and porphyry. The east crosscut from the north lateral drift on the 1500 level was extended 17 feet during the week, and is out 55 feet; face is in low-grade quartz, mixed with porphyry.

SAVAGE.—Milled 570 tons of ore of the average battery assay of \$17.25. We have haulion on hand amounting to \$7,000. The E-street tunnel has been repaired and advanced 50 feet since last report, making a total distance of 700 feet. The west drift

from the new station of the Potosi tunnel level has been extended 22 feet, making its total 95 feet from the shaft. On the 750 level they are extracting ore of good quality. On the 750 level the south upraise has been carried up 73 feet. They are saving some ore from this upraise. On the 1100 level the north drift from Hale & Norcross side was advanced 15 feet, making the total distance 135 feet from south boundary. This drift is in a solid body of clean quartz, but not quite good enough to save or pay. On the 1400 level have resumed work in the face of the main north drift and have advanced the same 22 feet; face in quartz and porphyry. The east winze from this level is down 19 feet; bottom in low-grade quartz.

HALE & NORCROSS.—On the 1400 level the north winze from No. 3 east crosscut is down 155 feet, to the 1500 level. The joint winze in No. 5 east crosscut on our south boundary has been extended 15 feet, making its total 40 feet. On the 1500 level the north lateral drift was advanced 35 feet, making total distance from the station 85 feet. This drift will soon be connected with the south winze from the 1400 level and will then be able to crosscut and thoroughly prospect this level. The bottom is most all in quartz giving low assays. The south lateral drift from the station on this level was advanced 25 feet; total depth, 65 feet. Face in quartz and porphyry. Have resumed work in the main incline below the 1500 station. Have retimbered the same 25 feet below this level.

UTAH.—Incline winze has been sunk 25 feet; total depth, 155 feet, continuing in porphyry, clay and quartz. At a point in the winze 140 feet down are cutting out a station.

SIERRA NEVADA.—Have repaired the Kenosha tunnel a distance of 130 feet. The west crosscut on the 650 level from the northwest drift, 571 feet from the shaft, is out 515 feet, 38 feet having been made the past week.

OCCIDENTAL.—Extracted pay ore from the stopes in the 350, 400 and 450 levels. North drift from No. 1 upraise, 500 level is in 123 feet, face in quartz and porphyry. The south drift from same point is in 97 feet; face in hard quartz giving low assays. The upraise from the south drift, 600 level, has been connected with the main tunnel on the 550 level. Have started a winze in fair ore from the south drift on the 600 level at a point 100 feet south of No. 1 winze. East crosscut from the north drift, 650 level, at a point 150 feet south of north line, is in 17 feet; face in quartz and porphyry giving low assays. The south drift, 750 level, is in 116 feet; face in low-grade ore.

ALPHA.—The south drift from the west crosscut, 100 feet north of shaft, 500 level, is out 9 feet; face in quartz yielding low assays.

EXCHEQUER.—The east crosscut on the north line, 600 level, is out 234 feet, face in porphyry.

CHOLLAR.—The south drift, 1400 level, was advanced 9 feet; total from north line, 146 feet; face in hard porphyry. The joint winze in the east crosscut, 1400 level, is down 50 feet; the bottom is in quartz and porphyry. Sent to the mill the past week 529 tons of ore worth \$23.09 a ton as per battery assays.

POTOSI.—The winze is down 144 feet below the 1400 level; the bottom shows porphyry and streaks of quartz. The south lateral drift from the Chollar incline, 1100 level, is out 251 feet; face in porphyry.

UNION SHAFT.—West drift from the shaft, 900 level, is out 369 feet, face in soft porphyry.

NEW YORK.—Northwest drift, 650 level, is out 240 feet; face in quartz and porphyry. North lateral drift, 1100 level, is out north of shaft 533 feet; face in quartz yielding low assays.

SILVER HILL.—The southwest drift, 50 level, is out from shaft 100 feet; face in porphyry. South crosscut, 160 level, is out from winze 575 feet; face in hard porphyry.

ANDES.—On the 420 level east crosscut from main south drift, after being extended a total length of 273 feet, was stopped. East crosscut No. 2 from north drift has been extended a total length of 170 feet. From the crosscut at a point 125 feet from main north drift, a drift has been started north and has been advanced during the week 12 feet in quartz which yields low assays. East crosscut No. 3 from main north drift has been started and is now in 16 feet; face in quartz, clay and porphyry.

Cherry Creek District.

NOT SATISFACTORY.—White Pine *News*, June 13: The new mill at the Star mine in Cherry Creek has been shut down, the new concentrators not working satisfactorily. A gentleman who thoroughly understands the process has been sent for to Colorado, and when he arrives work will again be resumed.

Oseola District.

QUARTZ AND GRAVEL.—White Pine *News*, June 13: A gentleman in from Spring valley informs us that mining matters at Oseola are progressing very favorably. The Cumberland Group has now passed into the hands of the Boston syndicate, and it is expected they will put quite a force to work within the present month. They will sink a shaft and run a tunnel and do other development work on the Cumberland. This mine already has a shaft down 100 feet and a tunnel 80 feet, and has openings at other points, where considerable pay ore has been found, that has averaged \$30 per ton in free gold. The Oseola mine, another of the group, has a vein three feet wide that goes \$25 in gold. It has a shaft down 80 feet and drifts have been run both ways, and some stopping done. The vein has been stripped on the surface for a distance of 600 feet. The Royal Flush, belonging to the same group, has a shaft down 160 feet, with 18 inches of ore in the bottom that mills \$30. The Revenue, still another of the series, has a vein two feet wide on which a shaft has gone down 20 feet. The ore in this mine is said to be better than in any of the others, ranging from \$30 to \$45 per ton. The four claims are owned by the Boston syndicate, and with a reasonable outlay promise to develop into a very valuable property. We are further informed that all the purchase money has been paid up. Boone Tilford is getting rich on his dry-wash claim. He has six or eight men at work, and it is said they average \$10 a day to the man. Boone is in luck and he deserves it for he stayed with the camp in its darkest days. The Gravel Co. has an abundance of water and is tearing down a large amount of gravel, and will no doubt make big clean-up this season.

Pioche District.

WEST HAM MINE.—*Pioche Record*, June 11: The four months bond taken on the West Ham mine by Sam T. Godbe last February for \$5,000 ex-

pired on Wednesday the 9th inst, but the sale was not effected. The prospecting work done on the claim since the bond was given shows up a ledge of good low grade ore, which cannot be profitably worked, however, without the aid of cheap transportation, and the uncertainty attending the construction of the U. P. road to this section is one of the main reasons given by Mr. Godhe for not taking the property. The property possesses merit, however, and will come to the front with a reasonable amount of work performed on it.

Safford District.

COMET.—Eureka Sentinel, June 13: A shipment of two tons of ore from the Comet mine in Safford district, this county, netted \$300.

Tuscarora District.

NEVADA QUEEN.—Times-Review, June 11: South drift from east crosscut on the fourth level of Commonwealth, has been extended 12 feet in the vein.

NAVAJO.—The stopes above the 350-foot level continue to yield about the same, the seam is small but very high grade. Sent to the mill 55 tons ore, assay value \$197.93.

DEL MONTE.—Second level: Have started a drift north from joint raise, also joint intermediate drifts east and west, all of which show a little ore.

COMMONWEALTH.—First level: West drift from shaft in 40 feet, face all in the vein, 18 inches being \$40 ore. Hoisted during week 35 cars ore, assay value \$43 per ton. Fourth level: North drift from east crosscut on fourth level extended 18 feet, still showing bunches of good ore. Crosscut from north drift in 20 feet, ore 20 inches wide, assays \$16 per ton.

NORTH COMMONWEALTH.—Fourth level: North drift advanced six feet, most of the week have been timbering. Hoisted 11 cars first-class ore and 55 cars second class.

BELLE ISLE.—North drift, 350-foot level, extended 14 feet, vein getting larger and the grade of ore continues high. South drift extended 13 feet, still yielding good ore. Have now opened 68 feet in length on this ore, all of which distance shows a good-sized vein of rich ruby ore. The stopes started over this drift are being pushed as fast as possible, and show about a foot of solid rich ore. Have just started to milling, a battery sample shows \$305.39, this is from ore culled from the ore shipped in March. Concentrated 132½ tons, assay value \$26.01, giving 18,200 pounds wet concentrates, estimated assay value \$273.36.

NORTH BELLE ISLE.—East crosscut from the Belle Isle 450-foot level extended 16 feet. No. 2 crosscut, 400-foot level, extended nine feet. South drift from No. 1 crosscut extended 21 feet and connected with No. 2 crosscut. North drift, same place, 18 feet. The stopes above these drifts continue about the same. Six cars of first class and 74 cars of second class ore have been broken. The stopes from No. 4 chute, 600-foot level, continue to show some very rich ore. West crosscut from the 600 station extended 21 feet, rock very hard but breaks well. East crosscut, same place, extended 14 feet; the ground is short and extremely hard. Sent to the Union mill 78 tons, assay value \$255.19. Concentrated 170½ tons, estimated value \$15.45, yielding 19.43 tons wet concentrates, estimated value \$190.70.

ARIZONA.

STARTED UP.—Journal-Miner, June 10: The Copper Basin plant, owned by the Commercial Mining Co., was started up to-day. The plant is a very extensive one. The company has 125 men in their employ at present. General W. O. O'Neil recently received an order from New York for two carloads of onyx from his Big Bug mines. The fact is just becoming generally known that Arizona can produce the finest quality of onyx in the world. A piece of onyx weighing about 60 tons was cut out of the Big Bug onyx claims recently. It is 20 feet long by six feet wide and five feet thick. This is without doubt the largest piece of onyx ever taken out of any mine in the world. There seems to be scarcely any limit to the size of the blocks that the Big Bug mines are capable of yielding. Our correspondent at Prescott Junction writes that the article which recently appeared in the Journal-Miner relative to the new discovery of mineral in National canyon, a tributary to the Grand canyon, has resulted in the receipt of numerous letters of inquiry in regard to it. The original discoverers will shortly make another trip into the canyon, for the purpose of doing some work on their claims. Other prospecting parties have also gone to the scene of the new mineral field. Geo. W. Sines and John Ross, on their return trip from the Bradshaw mountains, recently, picked up a piece of float in Maple gulch which will go away up into the thousands in silver. It is water worn until perfectly smooth, and is what prospectors call "the traveler," as it has the appearance of having traveled hundreds and probably thousands of miles. How it came to the place where it was found, is of course a mystery, as it was found near the summit of the Hassayampa divide, at an altitude of about 7000 feet, where there has never been any ore resembling it in any respect whatever discovered within miles of the place.

COLORADO.

THE LITTLE ANNIE.—Aspen Times, June 11: To-day seven teams are hauling ore from the Annie. The force will be increased to 10 teams to-morrow. Only three teams were hauling last week. All the ore carrying 25 ounces and above is shipped together. The grade of last week's shipments was 39 ounces. If the low-grade ore can be successfully treated there are 5000 tons of 15 to 25-ounce ore on the waste dump. The mine is now in condition to work 20 men on pay ore and 50 more men can be employed on the low-grade mineral. Development work will be kept ahead of stoping.

THE MIDNIGHT.—The Midnight shaft is now down about 200 feet at a point near the east side line and a few feet from the west line of the Iron mine. Some good-looking rock showing lead and native silver has been reached. This is doubtless mineral from the vein west of the porphyry.

MINING SALE.—Denver Republican, June 11: Three good purchases of Red Mountain mines have just been completed through the agency of Denver parties. A total sum of \$332,000 has gone into the San Juan in consequence. Attorney E. W. Waybright returned yesterday morning from Ouray, where he had been to close the purchase of the Car-

bonate King mine for Mr. James McKay of Pittsburgh, Penn. The price paid for the property was \$75,000, cash. The Carbonate King is located on Red Mountain, in the San Juan. The owners of the property had every confidence in it. They had developed it and taken out about \$40,000 worth of ore while doing so, but recently encountered a good ore body and a strong flow of water at the same time. Rather than go to the great expense of machinery they concluded to sell. Mr. McKay is always in the market for a good thing and he did not hesitate in taking it at the price quoted. He will at once put in about \$20,000 worth of pumping machinery and enter at once into the further working of the mine. The deeds have passed, titles been examined and money paid. The former owners were James E. Wood, L. R. Lindsey, J. J. Crooke and others. The Silver ledge syndicate of London, through its American representative, Judge C. M. Campbell of this city, has secured a group of rich Red Mountain properties. The negotiations for these have been pending for over a year, but they are now all but completed. Judge Campbell returned from the camp yesterday morning. The properties in the group are the Silver Ledge, the Addie S., the Iron-Silver, the Morning Star, the Blue Bird, the Turquoise, and the Lone Star. The purchase of the first three is decided upon definitely, and bonds have been taken upon the others until the titles can be fully examined. The price paid is \$50,000 cash and \$135,000 in the stock of the company.

DAKOTA.

IRON HILL.—Deadwood Pioneer, June 11: A gentleman, thoroughly reliable, who was permitted to inspect all the levels of the Iron Hill mine recently, said yesterday that there was an abundance of good ore in the mine.

STONE PLACERS.—Under the recent ruling of the secretary of the interior, the commissioner general of the land office is holding for cancellation all applications for patent as stone placers that are valuable only for stone for building purposes. This ruling was based on the belief that such entries do not properly come under the head of stone placers. This action will unsettle title to a number of various kinds of stone claims in the vicinity of Deadwood that have become valuable as real estate.

NIGGER HILL TUN.—A special dispatch from Chicago announces that C. L. Brondson, who is erecting tin plate works at Aurora, Ill., states that his company has recently purchased an interest in some tin mines in Nigger Hill, and will work them.

IDAHO.

OPAL MINE.—Moscow Mirror, June 10: The Opal mine, discovered last fall near Moscow, notwithstanding the superstition that opals are unlucky gems, is proving a good find for the owners. As high as 150 carats, valued at over \$1000 have been taken out in one day, and the yield of the mine to date has been upward of \$10,000.

POORMAN.—Idaho Avalanche, June 13: The lower tunnel on this mine is now within a few feet of connecting with the shaft. When this connection is made it will furnish perfect ventilation and enable a large force of miners to work to advantage. Plans and estimates are all finished for a new mill at some convenient point near the mine. When the same have been approved by the owners, it is said work will be commenced. The present arrangement is for a mill of 30 tons daily capacity, with power for 50 or more tons.

MONTANA.

PLACERS.—Phillipsburg Mail, June 13: Placer mining is taking renewed activity in the Flint Creek valley this season. Several of the old diggings are being explored again, and some very good results have already been derived. A number of the old flumes are under way of repairing, and some new ones are being considered by the thrifty placer miners in the valley. Several streams of water from the hydraulics are playing upon the gravel banks, and with the abundance of water assured for this season there will be great activity in the placer mining industry this year.

GRANITE MOUNTAIN OUTPUT.—The output of the Granite Mountain Co. for the past week is 46 bars, containing 69,000 ounces silver and 165.6 gold.

WASHINGTON.

DISCOVERIES.—Snohomish Eye, June 13: Several new discoveries have been made in the vicinity of the Vandalia during the past two weeks, probably the most important of which was that by F. H. Coy and Chas. LeFever, two young tenderfeet, who went out prospecting for the first time last week. On the east side of the creek they found a 12-foot vein carrying a fine grade of galena with carbonates. As has been the case in many of the best districts of the country, this lode had been tramped over and overlooked by many old-timers and experts for several years. The boys, highly elated, came down with samples for assay. They will return this week. Jack Wesley is also said to have struck it rich in the same vicinity. Geo. Milliken, mining expert, in the employ of the N. P. railroad company, and Mr. Rust of the Tacoma smelter passed through town last Wednesday on their way to inspect the Silver Creek district. In conversation with a reporter Mr. Rust said: We propose enlarging the plant this season to meet the increasing business and hope to buy Silver Creek and other ores as soon as they can be transported by rail. The R. R. Co. has at the present time in the Silver Creek district several surveyors and mineral experts. Their purpose is to examine the mineral prospects of the district thoroughly and report also on the practicability of building a line of road into the district.

Don't Fail to Write.

Should this paper be received by any subscriber who does not want it, or beyond the time he intends to pay for it, let him not fail to write us direct to stop it. A postal card (costing one cent only) will suffice. We will not knowingly send the paper to any one who does not wish it, but if it is continued, through the failure of the subscriber to notify us to discontinue it, or some irresponsible party requested to stop it, we shall positively demand payment for the time it is sent. LOOK CAREFULLY AT THE LABEL ON YOUR PAPER.

MINES and Stock in Mines for sale. See advertisement on page 386.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR THE WEEK ENDING JUNE 9, 1891.

- 456,767.—TOOLS FOR CUTTING HOLES AND WASHERS—Jas. Addison, S. F.
453,963.—PENDULUM BAR TREADLE—E. A. Cochran, Pasadena, Cal.
453,768.—SAFETY GUARD FOR CARS—L. J. De Puy, Phoenix, A. T.
453,859.—FRUIT-SLICER.—Flickinger & Graham, San Jose, Cal.
453,902.—PLUMS AND LEVEL—Garner and Connaughton, Latourell Falls, Or.
453,769.—ORE FURNACE—J. L. Giroux, Jerome, A. T.
453,636.—BAG HOLDER—E. Henretty, Portland, Or.
453,841.—SAFETY CHECK-REIN HOOK—A. Kempley, S. F.
453,658.—DEVICE FOR STEAMING FRUIT—Phelan & Eldridge, Portland Or.
453,915.—DOOR CHECK—David Rankin, Pasadena, Cal.
453,778.—ADDING MACHINES—A. E. Shattuck, S. F.
453,765.—SHUTTER FOR FIRE GRATES—W. H. Vance, S. F.

The following brief list, by telegraph, for June 9 will appear more complete upon receipt of mail advices:

California—William H. Anderson, Riverside, tag and parcel tyer; Matthew Arnold, San Francisco, riveting machine; Nathan Brown, Oakland, safety guard for sleeping cars; Charles C. Davis, Los Angeles, portable burglar alarm; Geo. W. Hunter, Fresno, axle-setting machine; John F. Kirby, San Francisco, governor; Harry H. Love, Sacramento, two patents, wrench and ruling pen; David Lubin, Sacramento, writing-pen attachment; James and William Paterson, Stockton, assignors to the Benicia Agricultural Works, Benicia, harvester; Edward A. Rice, San Francisco, rock drill; Edgar P. Sanford, Merced, thresher; John C. H. Stut, San Francisco, cable railway gripp; Frank E. Tremper and J. W. Elsworth, assignors to Electric Vapor Engine Company, San Francisco, electric pole in gas or vapor explosive engines.

Oregon—Jacob A. Fulton, Astoria, filter.
Washington—William McLesnon, Port Angeles, pump.

NOTE.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

ADDING MACHINE.—Arthur F. Shattuck, S. F. No. 453,778. Dated June 9, 1891. This adding is one of that class in which the spring-actuated plate or plates are controlled by means of a pawl, and ratchet operated by keys. The invention consists essentially of oppositely moving plates, one moving varying distances and the other a given distance, as a result of which, combinations may be made of the first four digits with the fifth to obtain all the digits. The general object of the invention is to materially simplify the construction and operation of this class of adding machines, whereby greater rapidity and accuracy are obtained.

TOOL FOR CUTTING HOLES AND WASHERS.—James Addison, S. F. No. 453,767. Dated June 9, 1891. The invention relates to the general class of machine-tools designed for the cutting of holes in metal plates, boiler-heads, tube-holes, ship-plates and general purposes, and/or the making of washers. The object is to provide a simple and effective tool for these purposes, capable of necessity of first providing a hole for the tool center to act as a guide, and of taking all the strain and spring of the plate upon said center, thereby removing it from the cutters. In ordinary tools for cutting holes or cutting out washers, it is customary to first make a hole completely through the plate. This hole is necessary to receive the center, which serves as a guide for the cutters, and as said center feeds downwardly through the plate it must have a clear passage to move within the cutters. This necessity of making the hole first is entirely avoided by the use of this new machine. Moreover, with this machine, the strain and spring of the plate are taken entirely upon the center, thereby relieving the cutters, which have no more than their legitimate functions to perform—namely of cutting through the plate. Much more rapid and effective work can therefore be performed by this machine, which is at the same time simple in construction and readily operated.

SAFETY GUARD FOR CARS.—Louis J. De Puy, Phoenix, Arizona; assignor of one-half to R. A. Gray, Colusa, Cal. No. 453,768. Dated June 9, 1891. This invention relates to that class of safety-guards for cars in which fenders entirely surround the lower part of the car, and inclosing the wheel space, are employed. The invention consists of the endless movable fender. This fender is normally in a state of rest having no movement relatively to the car at all; but when it comes in contact with an obstructing body, said body being stationary or moving at a less speed than that of the car, it will readily be seen that the fender will be caused to have a movement lengthwise independent of the car by reason of its contact with the body and the movement of the car. If, therefore, for example, a body falls up against the side of the fender, it will thereby be moved on its pulleys while the car proceeds, and the body will soon find itself at the end of the car, where it will be free. Thus there will be no injury to the body, as it will not be pulled or rolled along.

SHUTTER FOR FIRE-GRATES.—Wm. H. Vance, S. F. No. 453,765. Dated June 9, 1891. This is a device which the inventor calls a shutter or door for fire-grates, and which is especially adapted to be open so as to expose the fire in the grate or to be closed so as to entirely shut it off from the room. The sliding doors or shutters, which move in grooves in front of the grate, are made double, so as to leave an air space between the two parts so

they will not be injured by the heat. By the use of these doors the rate of combustion of fuel in the grate may be regulated, and at the same time the heat of the room may be increased or decreased, as desired, by opening or closing the doors. These doors make it possible to leave the room when there is a fire in the grate, without there being any danger of fire falling out and causing an accident.

Mining Share Market.

Comstock mining shares the past week hung around under light trading and fewer cross orders by the pool. The falling off in cross orders was probably done to confirm the prevailing belief that lower prices will obtain before the fall deal sets in. It is generally claimed that the heaviest setback in prices will come in the Middle and North End stocks, for Exchequer, Alpha, Belcher, Challenge, Crown Point and Seg. Belcher, in the Gold Hill group, are too low now to justify any decided break. Those who know what there is in the mines stand ready to buy on a break, or when prices on a gradual setback shade off more. For over nine months about everything has worked in favor of the pool; and they have not been slow to take advantage of the favoring circumstances to force the market down as low as possible to gain stock. After the very low prices in late December, the upheaval in Con. Virginia in May of this year to \$20.50, and sending it down again showed a master-general's hand, for by the break Confidence was destroyed, and large numbers of outside holders of stock sold out. And now comes a report, apparently well authenticated, that papers are drawn up by a mining company, whose patented grounds are to the west of Con. Virginia, to enjoin the latter mine from taking out the very rich ore recently developed to the west on two or more of its levels. Con. Virginia has considerable rich ore of its own that it can take out, without touching the above, yet the pool will undoubtedly handle the injunction for all it is worth, to get more stock at low prices. The pool now has over 150,000 shares, but will not object to having 200,000 shares of the stock. The writer still has faith in a good-sized deal, but top prices may not be reached before next September or October.

In outside shares trading continues slow. The public is seemingly taking very little interest in them. Some day operators will find their mistake and see that it is in them that the largest percentage of gain was to have been made.

An Oakland operator bought Con. Virginia around \$5 a share, and when it got up to about \$19 and \$20 did not sell. He thought the market would not be a sell until Senator Fair's real estate or some other of his large successful speculations were written up by the daily press.

The news from the Comstock mines warrants the belief that the mine managers are pushing work to develop the ore to the west in Sierra Nevada Union and Ophir, and perhaps that in Mexican. In Con. Virginia they are uncovering the very rich ore to the west on the 1100 foot level—a downward continuation of that found on the 800 foot level. They are also developing the 1750 foot level, where there is rich ore. In Hale and Norcross they have run into very rich ore on the 1100 foot level, and are pushing the work to develop the rich ore known to exist about the 1500 foot level. In Chollar, Savage, and Gould and Curry, they are, apparently, making slow progress in developing work—perhaps there is too much stock out yet. There are rumors afloat of a rich find in Potosi, and that in Bullion something good can be looked for soon. Whether the reports are founded on fact or for assessment purposes, we do not know. In Alpha they are preparing to run on a lower level for the rich ore found over a year ago. Quiet but interesting work is being done in Exchequer, Challenge, and Confidence. Miners are looking hopefully to the time when Con. Imperial will start work on or about the 1100 foot level. In Crown Point work is under way to develop the 500 foot level to the west. The superintendent, in his annual report, spoke favorably of this level. The water in Belcher and Seg. Belcher is being lowered, which ought to admit of very important work being commenced soon. In Overman they can take out large quantities of rich ore whenever the pool will allow the supposed manager or managers of the mine to do so. In the Alta group quiet but important work is being done. Never within the history of the Comstock mines was the situation in the mines as favorable as it now is for exciting profitable times.

To-day's advices received from Virginia report that the strike in Hale and Norcross is to the west on the 1100-foot level, near the Chollar line. The ore is rich and ledge large. The strike in Potosi is in the Potosi Bullion south drift.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

Geo. Wilson—Sacramento Co.
J. C. Hoag—San Francisco.
F. W. Knapp—Amador Co.
G. B. Gill—San Luis Obispo Co.
E. L. Richards—Escondido, Cal.
Frank S. Chapin—Tulare Co.
B. F. Belt—Shasta Co.
J. H. F. Williams—Tulare Co.
A. S. Cooley—Tehama Co.
Samuel E. Watson—Sonoma Co.
Herbert Stanley—Modoc Co.
C. J. Wade—San Bernardino Co.
J. H. Croosman—San Bernardino Co.
E. H. Schaeffer—Central California.
Wm. M. Hillman—Oregon.
F. B. Logan—Arizona.

Complimentary Samples.

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MECHANICAL PROGRESS

Brass and Copper Welding.

To temper copper has always been as great a problem to the metal worker as the transmutation of metals was to alchemists. Second only to this, and really of greater economic importance, is the question of welding copper, brass and a number of other metals. Heated to a certain point, brass becomes extremely brittle, and besides oxidizes so rapidly on exposure to the air as to render welding by the application of external heat, a practical impossibility. But an invention of Mr. J. H. Bevington, and owned by the New Process Welding Co., of Chicago, does away with all difficulties, and that in the simplest manner imaginable. The heat necessary to soften the metal to the welding point is evolved from the metal itself, through the application of friction.

Many say the Chicago *Journal of Commerce* will wonder that the this principle should not long ago have been applied to the welding, drawing and shaping of metals like brass. It must be remembered, however, that the essence of invention lies in a wide, almost universal observation, and an ability to see and take advantage of suggestions, which power, the common mechanic does not ordinarily possess to any marked extent. Mr. Bevington no doubt possesses the power of utilizing suggestions and of combining into something new and valuable, principles already well understood. The inventor, the company and the metal worker, are alike to be congratulated upon this wonderful achievement.

A REMARKABLE RUN OF IRON.—The Mancosla (Mich.) *Herald* says: Stack No. 2, blast No. 1, of the Antrim Iron Furnace, completed the third year of its present blast April 15. Number of days in blast, 1,050, and the total product during that time amounted to 66,347 tons of pig iron—a daily average of 63½ tons. A trifle over a year and a half of this run, or, to be exact, 582 days of it, the stack was blown with a small Weimer engine, with a product of 32 326 tons—a daily average of 55½ tons. The balance of the run (468 days) was made with a large engine of the same make, during which time the product amounted to 34,021 tons—a daily average of 72½ tons. To make this amount of iron, 115,410 tons of ore was used, and 146,000 cords of wood consumed. Had the stack been blown during the entire period with the large engine, the total product would, of course, have been much greater, but the record is a remarkable one, nevertheless, and it is believed that no charcoal stack in the United States has ever made so long a run or so large an amount of iron with a single lining.

LARGE STEAM PIPES COMPOSED OF SMALL ONES.—The immense steam pipes which are necessary for the large-sized engines in use at the Ferranti stations, are composed of numerous smaller pipes bunched together to give the required carrying capacities. This arrangement of the pipes was thought necessary on account of the numerous accidents which have lately occurred from the bursting of large steam pipes in various parts of the world. Just how this arrangement will be accepted by engineers remains to be seen. While there are several good points about this kind of steam pipe, there appear to be also several poor ones. The increased cost necessary for its construction, and the larger amount of surface exposed for condensation, would appear to be somewhat against its being commonly employed. Of the increased safety assured by its use, *The Stationary Engineer* thinks, there can be no doubt, but whether or not it can be called a commercial success, is not so plainly evident. Those who have had experience with it appear to think it answers every requirement.

MISGUIDED ENTHUSIASM OF INVENTORS.—The patent office records testify, remarks a contemporary, to the misguided enthusiasm of inventors in no more conspicuous manner than in hand rock drill patents. There have been, perhaps, as many patents taken out on hand rock drills as on power drills. In every case the inventor aims at something beyond reason. He seeks to do more work with a machine in the hands of a human being than that person is capable of performing. He seems to labor under the impression that a machine creates power, when, as a matter of fact, it only utilizes or transmits power. Every person has a certain capacity for work. He cannot exceed that capacity. He is limited by power, which is represented by strength, and by time, which is represented by endurance. In other words, he is like a lever which may lift a heavy weight slowly or a light weight rapidly, but in each case the weight and the time, when multiplied together, give a result which is the same.—*Ex.*

WIRE 1 500TH OF AN INCH IN DIAMETER.—In an interview recently published, a wire manufacturer made the following statement: "We are at work just now on some pretty small wire. It is 1 500th of an inch in diameter—finer than the hair on your head, a great deal. Ordinary fine wire is drawn through steel plates, but that wouldn't do for this work, because if the hole were away ever so little it would make the wire larger, and that would spoil the job. Instead, it is drawn through what is practically a hole in a diamond, to which there is of course no wear. These dia-

mond plates are made by a woman in New York, who has a monopoly of the art in this country. The wire is then run through machinery, which winds it spirally with a layer of silk thread that is .0015 of an inch in thickness—even finer than the wire, you see. This wire is used in making the receiving instruments of ocean cables, the galvanometers used in testing cables and measuring insulation of covered wires.

AN IMPROVED KNITTING MACHINE.—A new machine is being put on the market by a Dresden, Germany, knitting machine manufacturer, which, in some respects, resembles an ordinary knitting machine, and can be employed as such on round and flat work, but is especially adapted for variegated patterns. It works variegated pattern, cardigan stitch, pearl cardigan, two and two rib, also embodies the peculiarities of a stripping machine, producing in one piece of goods single, colored, striped, and many colored patterns without changing the machine itself. It is also claimed to be capable of producing complete gloves. By the placing in or out of the hack thread in the slotted thread conductor, it is claimed any desired number of shades can be produced, which gives the impression that these patterns had been the result of embroidery.

IMPROVED CAR WHEELS.—A new and practical method for fastening steel tires to car wheels for railway service has been recently announced, which will be looked at by consumers of such with a good deal of interest, for it is the first system ever introduced that gives entire satisfaction. The system lays in placing a small notched steel plate between the tire and wheel, and sending each alternating projection into corresponding grooves in the tire, and the remaining projections are bent over the edge of the wheel, making a solidly fastened tire, and one which will be capable of standing much more wear than has ever been the case.—*Manufacturers' Gazette.*

A NEW DEMAND FOR METALLIC WORK.—A gentleman well acquainted in Australia recently stated that "the people of that continent are in need of metal furniture." He has been in England to secure school desks and seats of light metal which will be durable and cheap, but neither in England nor in America has he been able to get what he wants. He says "the pest of Queensland is the white ant, against the ravages of which sheet-iron roofing and tin-covered chairs are the only protection thus far devised. The ants eat wood of every description, boring the doors and house rafters until they are honey-combed, tables, bedsteads and bureaus suffering similarly."

AN ALUMINUM BOAT.—A late mechanical wonder of the age is a pleasure boat, to accommodate four persons, and which will be made entirely of aluminum, and is to be propelled by electricity, by means of a storage battery also made of this metal. It will be the product of a Pittsburgh (Pa.) plant. Since aluminum, as per latest authentic report, has been reduced to 50 cents per pound, we may soon expect to see this metal more generally applied to fancy boats, yachts, etc.

A NEW GATLING GUN.—Dr. Gatling is working on a new gun, which will knock the spots out of his famous pepper-box gun. His object is to make war so dangerous that nations will have hard work to decide between it and peace.

The London Engineering for May 1st describes a new method of making weldless steel chains from a bar of cross-shaped section, which is drilled through diagonally and the links shaped under presses by punching and shearing.

SHIP RIVETS.—So rapid is the production of ship rivets by machinery that one train of rolls feeds four machines, which turn out 16 tons of rivets in 24 hours, the work going on night and day.

ALASKAN MINING EXPEDITION.—The steamer South Coast left a few days ago for Alaska, with 57 miners for the Amalik and Pioneer gold mines. The principal owners are J. C. Green, who has been managing the mines for the last nine years, and Captain A. M. Brown, U. S. N. Working on a small scale, good results have been obtained, and now an attempt is to be made on a large scale. With this object in view, the company is taking up 55 miners, mechanics and laborers, a stern-wheel steamer of 50 tons, a diamond drill for prospecting, 15 horses, three 50-ton barges, 25,000 feet of lumber, and provisions for 18 months. It is also the intention of the company to build two ocean steamers. The latter will trade between San Francisco and Alaska, and the stern-wheeler will connect with the mines, which are 40 miles inland.

CALIFORNIA MACKEREL.—It is said that samples of mackerel, caught off the coast of San Pedro have been sent East and pronounced superior to the best Eastern mackerel. The writer has seen the ocean between Catalina and the mainland white-capped as far as the eye could see with schools of these fish. Quite a large pack of these fish was made at Catalina last year, and brought the highest price in the Los Angeles market. The fishing industry is bound to be an important one on the southern coast of this State.

SCIENTIFIC PROGRESS.

Counting the Dust in the Air.

One of the most remarkable contrivances of modern times has enabled scientists to count the dust particles in the air, many of which are readily seen by means of a sunbeam allowed to enter a darkened room through a small orifice. To Mr. John Aitken, an ingenious Scotch physicist, the world owes this new and interesting method of research. A report of these experiments has been published in *Knowledge*, from which we condense as follows:

One of the most remarkable contrivances of modern times enables us to count the minute inorganic dust particles in the air. To Mr. John Aitken, an ingenious Scotch physicist, we owe this new method of research.

The bright motes that dance in the sunbeam seem beyond the power of computation, yet by a marvel of mechanical ingenuity Mr. Aitken has counted them, the invisible particles being brought within the range of vision, and even within the limit of easy enumeration.

The method of numbering the inorganic particles depends upon a principle which was established by Mr. Aitken in his determination of the formation of fogs. He showed that without dust there could be no fog, no mist, no rain. Without dust there would be only dew on the grass and road. This principle can be easily illustrated. Let common air be forced through a filter of cotton into a glass receiver, from which the air has been exhausted, and let a glass receiver filled with common air be placed beside it. If steam be now admitted into the receivers, the one containing the common dusty air will soon be dense with fog, while the other containing the pure filtered air will remain perfectly clear. The particles of dust, then, are the free surfaces, which, in certain conditions, attract the water vapor of the atmosphere to form fog. Invisible before, they are touched by the magic wand of a lowering temperature and start into visible existence. The dust particles are clothed all over with the moisture and become fog particles. The above experiment is very simple and may be readily understood.

It then occurred to Mr. Aitken that if a small measured quantity of the common dust-impregnated air be mixed in a receiver with a large measured quantity of dustless air, which has been filtered through cotton, the particles of dust would be some distance from each other, and when these particles were made centers of condensation of vapor by lowering the pressure, fog particles would be formed, which could be counted by means of a magnifying glass. If, moreover, these particles fell from a certain height on a small, measured area, the number could be accurately ascertained. That is the secret!

This more definite experiment was accomplished by a very ingenious device carefully manipulated, by which process Mr. Aitken counted seven and a half millions of dust particles in a cubic inch of the ordinary air of Glasgow. In the air outside the Royal Society rooms four millions in the cubic inch were counted. Inside, at four feet from the floor, but near the ceiling, after the gas had been burning for some time, no less than 49 millions were counted in the cubic inch. After the two hours' meeting of the Fellows, the numbers increased to six and a half millions. He counted in a cubic inch of air immediately above a Bunsen flame no less than 489 millions of dust particles. Of course, when the air is very dense with dust particles, a fraction of an cubic centimeter of the air is introduced into the flask for the experiment, and, when the air contains fewer particles, more than one cubic centimeter is introduced.

The air of Colmonell, in Ayrshire, has been found to contain from 8000 to 155,000 particles in the cubic inch. At Hyeres, in the south of France, he found from 50,000 to 400,000, according to the direction of the wind. At Lucerne, in Switzerland, the specimens of air tested were remarkably free from dust, some even as low as 3500 in the cubic inch—the lowest observation yet made.

The question next arises as to whether 3500 particles in the cubic inch of air is the lowest limit which the atmosphere ever attains to. Even away from the contaminations of smoky towns and villages the air contains cosmic dust. There is always dust in the upper atmosphere, for without the dust no clouds could be formed, and of cosmic dust there must always be a considerable quantity in the air produced by the waste from the millions of meteors that daily fall into it.

"The gay motes that people the sunbeams" are not, therefore, as Milton considered, "numberless." They have been enumerated with marvellous accuracy.

The Odor of the Soil After a Shower.

Some 25 years ago, Dr. T. L. Phipson, F. C. S., devoted much time and study to the above-named subject, but never published the result of his inquiries. Quite recently he learned by a paragraph in the *Chemical News* that Prof. Berthelot and M. Andre are now studying the same phenomenon, but have not yet arrived at

any definite results. Under these circumstances, Dr. Phipson hastens to give to the world his notes upon the subject, which, he says are dated 1865. They possess considerable interest and are given as follows:

After a considerable number of observations, I arrived at the conclusion that the odor emitted by soils and sedimentary strata after a heavy shower of rain in summer was due to the presence of organic substances closely related to the essential oils of plants, and it appeared evident to me that during the hot, dry weather, these porous surfaces absorb the fragrance emitted by thousands of flowers, and give it up again when the rain penetrates into these pores and displaces the various volatile substances imprisoned therein, which are only very slightly soluble in water. I believe that many kinds of soil possess this property, but those on which my observations were first made were the chalk soils of Picardy, in France. I found that not only chalk, but also marls, compact limestones, phosphatic rocks, and some kinds of schists and amphibolites are porous enough to possess it to such a degree as to emit a decided odor when they are strongly breathed upon.

Finding the property of which I speak very remarkable in certain chalk rocks of Picardy, I endeavored to ascertain the nature of the substance or substances to which it was owed. I dissolved a very large quantity of the chalk in dilute hydrochloric acid, and passed the carbonic acid through various media, water, alcohol, weak potash solution, and dilute acid; but none of these liquids appeared to arrest the passage of the odoriferous substance. The only liquid which I found would retain it was an aqueous solution of bromine. This arrested it, and when the bromine solution was afterward carefully evaporated at a low temperature, a yellowish product, soluble in alcohol, and having a strong odor of cedar wood, was obtained, which, from its chemical and physical properties, appeared to be very similar to, if not identical with, bromo-cedren, derived from essence of cedar.

Preserving Milk.

Many devices have been tried to so preserve milk as to retain as near as possible its natural condition. The latest effort is described by the *Scientific American* as follows: Fresh and sound milk not later than one hour after milking is placed in jars made of a suitable material.

The jars are made in three parts. The bottom part, in which eventually the milk is preserved, is first filled; the other two parts together form what is called the mediator. This is screwed into the bottom can and acts as a filler. For this purpose, even after the bottom can is filled, the top filler is kept three parts full.

When a number of cans and mediators have been fixed in a tray, they are filled, and the whole lowered into water in a suitable boiler. The milk is heated up to about 200° F. As soon as the mediator and can are full, by the milk expanding, a tap at the top of the mediator is turned, and the whole is thus hermetically closed. The water in the boiler is then raised "to an intense heat, and this will keep the milk for another 50 minutes at a somewhat high temperature." The jars are next deposited upside down in a cooler, and left in this position for 60–80 minutes. This insures the mixing of the milk, as it is in the nature of the milk that its fatty particles, and therefore the butterfat, will rise to the surface. The cans are finally placed in an upright position. The vacuum above the milk in the mediator is caused by the contraction of the milk. The air-tight stopper between the can and mediator is now turned, and as the ordinary temperature is rather higher, the can will be full, and there is little chance of the fat coagulating, should the cans be shaken. The mediator is opened, and the milk in it having been run off, it is taken off and the process is complete. The milk is said not to lose its freshness, purity and sweetness, even after 18 months or two years in hot countries, and when opened tastes like new milk, fresh and sweet.

SOME RARE METALS, possessing special qualities, are required for certain work. Thus, palladium is used in making some parts of timepieces, and iridium for the points of gold pens. Lithium is the lightest of all metals. Rhodium is extremely hard and brittle, and is only fusible at a very high temperature, and iridium is the heaviest substance hitherto discovered. The unutilized have no idea of the value of these scarce products, which are most of them, far more precious than gold and silver.

THE MOON AND THE BAROMETER.—By a comparison of records extending over a number of years, it has been ascertained that the moon has an influence in lowering the height of the barometer in the months from September to January, at the time of full moon, and in raising it during the first quarter. No effect has been perceived in the other months.

DECREASE OF MOUNTAIN HEIGHT.—No less than four different mountain peaks in Idaho are now from 13 to 23 feet lower than they were 15 years ago. This settling is supposed to be going on in many others. The cause of the settling is generally supposed to be the presence of quicksands at their base.

ELECTRICITY.

Electricity and Industry.

In the census taken ten years ago, a department was devoted to the subject of power used in manufactures, but its reports and tables dealt only with steam and water power, and made no mention of electricity. During the ten years that have intervened, the application of electricity to industrial purposes has been wonderfully rapid. About two years ago, *Electric Power*, a New York journal, printed a list of 150 industries to which the electric motor had actually been applied in this country, and one of the editors expresses the opinion that if a list were now prepared with equal completeness, it would show that the electric motor has found employment in connection with nearly 300 branches of productive industry. The electric motor has been successfully used to run the sewing machines of girls employed in glove making in their own homes, and with the reported result of enabling each worker to accomplish more and better work in less time, and under conditions more favorable to health and causing less fatigue.

With these facts before us, the introduction of electricity as a power applicable to a great variety of industries, and available in the private house and at the individual work bench, is no longer a dream or a prophecy, but an actual realization, of which the possible future development and industrial influences cannot be foretold. One of the principal articles of belief of the cheerful economic creed so ably propagated by Mr. Edward Atkinson, is that natural forces are constantly tending to a distribution of population more favorable to individual welfare. That where men have been too much isolated on great farms and sparsely settled tracts of land, the tendency toward higher cultivation of smaller areas, is operating to bring them into closer and better relations with the world, and that, on the other hand, where population has become too closely concentrated, in crowded cities and towns and over-crowded tenements, the development of rapid transit is operating to secure a distribution over a larger area, and to correct the evils incidental to a congestion of population at industrial centres.

In the latter direction, nothing could be more efficacious than the gradual adoption, in many industries and at many manufacturing centres, of a form of power peculiarly suited to such distribution, as would do away with the necessity for crowding hundreds of operatives together in the work-rooms of great factories. Such a change could be made to bring with it an amelioration of many of the conditions which now occasion most complaint, and to secure for a great mass of workers, more wholesome and cheerful surroundings, less crowded and better lighted and ventilated. Such a change seems like a dream of a return to the days of the hand-loom and spinning-wheel, and its possibility is an answer to much of the sentimental lamentation constantly heard about the changes which time and development have wrought in the condition of the toiling masses. Progress in the application of electricity to the employments of men, is but one of innumerable evidences that an improvement in social and industrial conditions is to be sought in the higher development of mechanical invention, and in the advancement of science, rather than in vain regrets for the simpler life of the irrevocable past.—N. Y. Commercial Bulletin.

ELECTRIC LOCOMOTIVES, which have long been anticipated, but in regard to which expectation has not been warranted by realization, may soon be found in extensive service. The commissioners who have been for some time engaged in devising plans for increased facilities for rapid transit in New York city have decided in favor of the construction of a four track railway, running underground below Canal street and elevated farther up town, to be operated by Bergman's electric locomotives of 300 horse power. This is a new motor in which the power is applied directly to the axles of every car, and it is claimed that the force is capable of propelling a train of 20 cars at the rate of 40 miles an hour, and that a train moving at the highest speed can be brought to a standstill within 12 feet. So much has been claimed for electric motors and so much disappointment has resulted from previous tests that actual demonstration will be required before these claims will be generally accepted; but that electricity can and will be successfully applied to the running of trains not only upon city railways but surface roads now operated, by steam, we continue to have little doubt. It does not take extraordinary faith to believe the predictions of Edison and others that ere long coal burning and smoke and fire producing engines on railways will be superseded by smokeless and steamless locomotives, whose power is furnished by that still mysterious and wonderful agent electricity.—*Railway Age*.

WELDABLE BY ELECTRICITY.—Electric welding has proven quite universal. Experiments have shown that by this means it is possible to make perfect welds with 13 different pure metals, 22 distinct alloys and 27 different combinations of metals as copper to brass, tin to zinc, etc.

ELECTRICAL LITIGATION.—While electricity is constantly increasing in usefulness to mankind in all walks of life the litigation over pat-

ents for electrical appliances has proven a bonanza to the lawyers. It is estimated that all the suits growing out of contested electric patents in this country and Europe have gobled up about 30 per cent of the profits. Edison and his associates have paid about \$3,000,000 for professional services and the cost of litigation.

GOOD HEALTH.

BANANAS AS FOOD AND MEDICINE.—Dr. John Dougall of St. Mungo's College, Glasgow, has a letter in a recent issue of the *Glasgow Herald* on the banana. He quotes from Stanley's "In Darkest Africa," showing that "for infants, persons of delicate digestion, dyspeptics and those suffering from temporary derangements of the stomach, the flour, properly prepared, would be of universal demand." During Stanley's two attacks of gastritis, a slight gruel of this flour, mixed with milk, was the only material that could be digested. It is odd, also, as pointed out in Stanley's book, that in most banana lands—Cuba, Brazil, West Indies—the valuable properties of the banana as an easily digested and nourishing food have been much overlooked. Dr. Dougall has made some experiments in making banana flour. He concludes that it should be made from the ripe fruit at its place of production. In trying to make it from bananas purchased in Glasgow, he obtained on drying the pulp a tough sweet mass like toasted figs, an appearance probably due to the conversion of starch into sugar. Bananas contain only about 50 per cent of pulp, and of this about 75 per cent is water. They would yield, therefore, only one-eighth part of flour.

HUNGER AND INFECTION.—It is a well-known fact that hunger predisposes to certain diseases, but it has been reserved to two Turin doctors to demonstrate the increased liability experimentally. Their observations were carried out with the virus of bacillus anthrax on pigeons, a disease to which these birds are, under ordinary circumstances, refractory. They found, however, that six days' total deprivation of food rendered the birds amenable to the virus, on condition that food was still withheld. If, however, food was given at the same time as the virus, then they still successfully resisted infection. Further, when starvation was continued for two days after the inoculation, and food then given, the development of the disease, though not prevented, ran a slower course. Lastly, the virus proved capable of infecting birds well fed up to the date of inoculation, but starved subsequently. The line of investigation is evidently one which admits of further research, but the moral is obvious.

SANITARY SCIENCE.—Sanitary science, says the *Sanitary News*, is a science that does not relate to the earth we live on, or to the heavens we live under, but to the conditions of the homes we live in. We can live on the earth or under the heavens, without knowing much about them, but to live best in our homes, we must know them well. Geology cannot change the conditions of the earth beneath us, or astronomy those of the heavens above us, but sanitary science can change from unhealthy to healthy the conditions of the homes we live in. Is it not, then, a science worthy of study? It touches the highest interests of mankind, cleanses and purifies the present generation, and will strengthen and will glorify posterity. The effects of obedience to its laws are not remote, but immediate. They touch the everyday life of all, and enter into all the relations of life. They give strength and vigor to whatever capacity in which human endeavor is put forth.

TO PREVENT "SOUR STOMACH".—Some physicians prescribe the following as a preventive of "sour stomach": Avoid eating foods which ferment easily, such as sugar, potatoes, and the like. Drink hot water to wash the stomach out, say one cup about one hour before eating. This prepares the organ for the kindly reception of the food. Avoid fluids at meals, unless it be peptonized milk, which really is a semi-fluid food. It might be well to use the peptonized milk for a few days and eat nothing else. Should this not agree with you, eat scraped beef, broiled, using with it but little salt, and dried whole wheat bread. Be careful to not eat too much meat in hot weather, as it is quite heating. You may try for a drink a half-cup of cold skimmed milk, filling the cup with boiling water. Should you not be relieved by following the above, you had better hunt a sanitarium.

THE DOCTOR WHO SUCCEEDS.—A physician who understands human nature, who plays with the baby, makes friends with the children, and listens to the woes of the good wife and mother, says a medical journal, is the fellow to whom the master of the house most cheerfully pays the largest bills. It isn't the medicine that's bottled up, but it's the comfort and consolation that are unbottled that mark the broad line between an unsuccessful and a popular physician.

We lose about two pounds of water in 24 hours by perspiration, and the more we perspire the cooler we become. There are 27,000,000 pores on the surface of our bodies, which, if placed in line, would extend 28 miles in length.

ENGINEERING NOTES.

Pacific Coast Bridge Building.

Bridge building on the Pacific Coast has become quite an important feature in our engineering works. The great steel bridge across the Columbia river, at Vancouver, will be a mammoth concern. It will be 6000 feet from the Washington to the Oregon shore, and it will be double-tracked, with roadway on top for teams, and will be erected upon pneumatic piers. The pivotal pier, or draw pier, will support a draw which will give an opening of 200 feet space on either side for vessels to pass, and the span immediately south of the draw span will be 375 feet. Whole structure to be of steel, built ten feet above the high water of 1876, and 40 feet above low water. On account of the sandy formation, it will be necessary to go down 80 feet below low water to get a firm foundation. This gigantic structure will cost over \$4,000,000. It will be January 1, 1892, before the cars can pass over it. The company is pushing the bridge, and also the road, as fast as men and money and their present perfected plans will permit.

Another improvement in this direction is a new steel drawbridge of 315 feet span across the tidal canal, Oakland harbor, which, when completed, will form a very substantial structure.

There are several bridge-construction companies in San Francisco which are fully able to perform the best class of work in that line. The San Francisco Bridge Co., in addition to bridge building, are also largely engaged in railway building and canal construction.

The California Bridge Co. has done some very superior work in the construction of the Downey avenue and First street bridges in Los Angeles. Among other bridges contracted for by them is the steel draw-bridge on the San Francisco & North Pacific R. R. at Petaluma of 227 feet span. A Baltimore truss bridge built by the company near Salinas, Monterey county, is of two spans of 300 feet each, and is doubtless about the maximum size that has been built in combination work. The combination cantilever over the North Umpqua river, in Oregon, has a river span of 290 feet, with shore arms of 147 feet, and, aside from being a novelty in bridge construction, is the only structure of this type on the coast, excepting the Fraser River cantilever.

The King Bridge Co. of Cleveland, Ohio, has a branch concern in San Francisco in charge of Col. G. A. Eberhardt, which has done more or less work in almost every county in this State.

The Pacific Bridge Co. is the only one which builds suspension bridges extensively. They have built some of 400 feet span for carrying timber flumes across the mountain valleys. A number of bridges in the Sandwich Islands, some work now under way in China, and the recent completion of an iron pier at Ocos, Central America, shows the extent of the company's business territory.

As has been correctly stated by a contemporary, the majority of the Pacific Coast engineers have come here from the far East, adapting, as far as possible, Eastern ideas to Western material. Having an abundance of good timber and of unlimited length on this coast, fewer panels have been used and longer joists. The engineer back East who clings to 12 or 13 foot panels, either from choice or from inability to obtain long lumber, would be surprised to find that here panels of 25 feet are not at all uncommon.

MODERN PROGRESS IN PALESTINE AND SYRIA.—The work of laying the railway from Jaffa to Jerusalem has been actively resumed. The section between Jaffa and Ramleh is on the point of being finished, its length being about 25 miles, or about half of the whole distance; the other half will take about a year to complete. By the middle of next year, therefore, pilgrims will be able to go by rail from Jaffa to the Holy City, instead of hiring vehicles for which exorbitant prices are charged. On another part of the Syrian coast great improvements are in progress. The new harbor works at Beyrout, which had to be stopped on account of the heavy weather of the past winter, are again in full activity, and are expected to be finished in two years. The new port will form a basin nearly 900 yards long, by means of a jetty of this length almost parallel with the coast, and connected with the latter by a mole of 160 yards at one end, and one of 328 yards at the other end, with an entrance protected from the westerly currents. Like the railway from Jaffa to Jerusalem, the harbor works at Beyrout are being carried out by a French company.

THE LAST SCHEME for railway communication between England and France provides for a double tube, capable of containing two railway tracks, sunk about 40 feet in the channel. It is proposed to utilize the displacement and buoyancy of the tube to give the necessary support, piles being driven into the channel, to which the tube would be chained to prevent it rising.

ENGINEERS MUST STUDY.—A few years ago, says the *Stationary Engineer*, no one dreamed that in so short a time the electric light would become a regular part of the equipment of mills and factories. It was only when the dynamo found its place in the engine-room and

the incandescent light sparkled in the shops and workrooms that the engineer found anything of special interest to him in the study of electricity. Now he must study it whether he will or no, and though the knowledge he most requires must be of a practical nature, he must have a goodly amount of theoretical or "book" information in order to understand what he is doing.

USEFUL INFORMATION.

Cause of Forest and Other Fires.

The increasing frequency and wide devastation caused by forest fires is causing much uneasiness in the Eastern States. To assign the cause of such fires as a general thing is impossible. But there is a practical unanimity about the excessive carelessness. Many forest fires are supposed to be started intentionally in sparsely settled districts by whortleberry pickers, as it is well known that land where that berry flourishes furnishes a largely increased amount of such fruit for several years after being burned over.

Farmers often debate the following question: "Is it better to refuse a tramp lodging, and incur his hatred, or let him sleep in a barn, and burn it by smoking?" Mining accidents have often been caused by carelessness, but wise supervision has resulted in a marked decrease in explosions. The way matches are scattered about in private homes and business offices is appalling. Without knowing, it is reasonable to suppose that many forest fires are due to the carelessness of smokers, or to the thoughtlessness of men who fail to see that their campfires are thoroughly extinguished. There will always be incendiaries, but they form only a small fraction of society. It is not deliberate crime so much as carelessness that is responsible for these outbreaks.

The annual statements of sums paid out by fire-insurance companies seem large, but the actual marvel is that the number of fires is not much larger than it really is. Recklessness seems to be the rule, and prudence the exception. Boys scatter explosives for weeks before and several days after the Fourth of July. In nearly every factory, the careless manner in which kerosene is handled causes dread apprehensions among the timid. Constantly, half-consumed but still-burning cigars are thrown away. Thrown on a pavement, they are probably extinguished by the heel of the next pedestrian, but if thrown on the dry leaves of the forest, they may do terrible damage.

WOOD PULP MAKING, by the sulphite process is thus briefly described: The wood is peeled, discolored or decayed parts are removed, the wood is cut across the grain into thin chips, which are elevated to the top of the mill and dropped into large drums, about 14 feet in diameter, 24 feet long, and strong enough to sustain a pressure of from 75 to 200 pounds to the square inch. When packed full of chips, the drum is filled with sulphuric acid and other chemicals, and the cotton-like product is pressed dry and mashed, mixed with water, rolled flat and cut into shape for bundling, being 60 per cent moisture and 40 per cent fiber. Thus it goes to the paper-mill. One cord of spruce makes 1200 pounds of dry fiber, worth from \$1 to \$1.50 a hundred pounds. Freight is paid on the water contained rather than use dry pulp, which packs hard. A sulphite plant that will consume from 8 to 15 cords of wood every 24 hours, will cost about \$10,000.

A PERFECTLY BLACK PAINT for bass tubs is made as follows: Take two grains of lampblack, put into any smooth, shallow dish, such as a saucer or small butter plate, add a little gold size, and thoroughly mix the two together. Just enough gold size should be used to hold the lampblack together. About three drops of such size as may be had by dipping the point of a lead pencil about half an inch into the gold size will be found right for the above quantity of lampblack; it should be added a drop at a time, however. After the lampblack and size are thoroughly mixed and worked, add 24 drops of turpentine, and again mix and work. It is then ready for use. Apply it thin with a camel's hair brush, and when it is thoroughly dry the articles will have as fine a dead black as they did when they came from the optician's hands.

THE USE OF LUMINOUS PAINT appears to be rapidly on the increase, especially in some European countries. The new luminous paint, of German manufacture, by which oil or water colors, shining at night with white, red or blue tints, as may be desired, can be sold at retail at about \$1 a pound. At this price, the cost of covering a square yard of surface would be about 17 cents, so that it is likely to come into general use for painting the interior of cellars and other dark places. The luminous paint known as the Balmalm paint, which is manufactured in England, has been held at \$9 a pound, at which price it is too expensive for general use.

A NEW BOOT-CLEANING MACHINE cleans boots at the rate of a pair a minute, and is worked in the same manner as a sewing machine.

The period of a generation is said by a scientist to have increased from 30 to 42 years.



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SAN FRANCISCO:

Saturday, June 20, 1891.

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See Advertising Columns.

Passing Events.

An event of local as well as national importance is the receipt of the first commercial shipment of pig tin from the mines in San Bernardino county, this State. Steady shipments are promised and arrangements are being made to increase the monthly output above what is now possible with the appliances at hand.

The decision of the U. S. Circuit Court in Montana, on the railroad and mineral land cases is a severe blow to the mining industry of that State. The Montana Miners' Association, which has actively contested the cases and assisted the individual defendants, will carry the case to the U. S. Supreme Court now that the Circuit Court decision in an important suit has favored the railroad company.

The Plumas county miners have associated themselves together to contest the injunctions brought against the small hydraulic mines of that region. It is contended that these mines do no harm to the men and might be permitted to run without damage to farming lands.

PROGRESSIVE MINING.—The Central Nevada says: S. L. Cohoon went to Austin, Tuesday, to bargain with T. B. Hutchinson, superintendent of the mines, relative to boring holes by means of his artesian-well machinery, from the surface to a number of underground crosscuts now lacking a supply of air for working purposes.

We Shall Be Obligated.

The publishers of the PRESS would consider it a favor for subscribers to renew their subscriptions during the coming month. Many of those whose subscriptions have expired, or are about to, would probably not inconvenience themselves but would oblige us by promptness in sending in the money. A settlement of this kind from several hundred readers is of material assistance on occasion though the amount may be small from each. The price of the PRESS is sufficiently small so it should be little trouble for our subscribers to answer this appeal.

The Railroad Defeats the Miners.

It will be remembered that in Montana there has been a long-continued contest growing out of the mineral land cases along the line of the Northern Pacific railway, where the railroad claimed the mineral land in their grant. The miners who had taken up and were working claims on their lands have been fighting for their rights, and there has been organized action among them as against the railroad. Now, Judge Sawyer of the U. S. Circuit Court, has rendered a decision at Helena, which, if it stands, will give the railroad company title to some of the best mineral land in Montana.

The case was that of the Northern Pacific R. R. vs. R. P. Barden et al. In 1888 Barden took up a mineral claim about three miles from Helena, on a section of land granted the railway by Act of Congress. By this Act mineral lands were withheld from the railway. The road filed its map of proposed route through Montana in 1882. Miners of the State have all along contended that the exclusion of mineral lands included that known to be mineral at the time the building of the road was in progress.

Barden's case was hacked by the Mineral Land Association of the State, and was submitted to Judge Sawyer, whose opinion is exhaustive, and is, in effect, that to exclude any lands granted the Northern Pacific railway, they must have been known to be mineral lands prior to the location of the line in 1882. Judge Knowles of the United States District Court dissents from this opinion, and the case will be carried to the Supreme Court.

Plumas Gravel Miners.

The miners of Plumas county recently held a meeting at Quincy to discuss the methods of dissolving the injunctions now existing against the operation of the hydraulic mines of the county. J. W. Thompson of American Valley, Richard Thompson of Spanish Ranch, and A. W. Whitney of Crescent, were appointed a committee, with full power to act for the miners, to collect funds, employ counsel and adopt such other measures as they may deem necessary to accomplish the result aimed at.

Concocted action of this character is exactly what is needed by the miners of any one section. The opposition is thoroughly organized, but the mining community is not. If, as the Plumas miners claim, their mines are doing no injury to the rivers, they should see that the facts are properly presented to the people of the Sacramento valley. There is quite a difference between the big hydraulic mines and the small ones of Plumas, which are 100 to 200 miles from Marysville. If the debris people cannot be made to see the justice of the claims of the Plumas miners, then they can fight the question out in the courts and abide by the decision.

THE MECHANICS' INSTITUTE.—The agent of the Mechanics' Institute reports that 20 firms, representing all classes of machinery except laundry and woodwork, have applied for space in the coming exhibition. He is trying to induce the State Board of Trade to place their exhibit in the pavilion during the fair and has sent circulars all over the State calling upon producers to send samples of their products to the exhibit. Mr. Graves, the agent, also recommended that medals be awarded for meritorious inventions, and stated that 82 applications for 37,725 square feet of space were on file.

The United States and Great Britain have come to an agreement to prohibit the killing of seals in the Behring sea until next May. Meantime a number of sealing vessels have left this port to engage in work in the Arctic, and revenue cutters have been sent up to enforce the law.

The Mining Display at Chicago.

California Collections Already Made.

The Board of Control of the National World's Fair Commission has confirmed the appointment of F. J. V. Skiff, of Colorado, as Chief of the Mines and Mining Department of the World's Fair at Chicago. This appointment was foreshadowed some weeks ago, but it is now settled that Colorado gets this office.

We are not informed as to the intention of the California Commission with regard to a mining display from this State or if they have given the matter any consideration as yet, most of the interest so far having been centered on the subject of horticulture. But if this State is to be properly represented in the mining department it is time for the preliminary steps to be taken. It must be confessed that as far as individual miners are concerned, they are rather apathetic on the subject, and it will take several energetic men several months to arrange for a suitable display.

There is one way, however, that California could excel them all, and with very little trouble or expense, and that is to send the present collections belonging to the State, bodily, and not attempt to make a special collection. The collection of minerals, metals, etc., in the State Mining Bureau Museum is the finest in the country. The State University has the collection of the State Geological Survey, the Voss collection, Hanks collection, Keene collection and several others. These are all classified, arranged, identified and labeled. Each county and district in the State is properly represented. Every department of the mining industry has its separate place with locality indicated. No other States or Territories of the Union have any such collections as belong to California now. There are no other mining bureaus to make such collections, nor have any of them spent the money we have.

Special collections were made here for the Paris, Philadelphia, and New Orleans Expositions, and many of those specimens are in the Mining Bureau. The gathering of these samples has been going on systematically for years. Meantime, they have been grouped and classified with care and scientific accuracy. Unless there are legal obstacles to taking the collections out of the State, there can be no reasonable objections. The university could keep its working collections used by the Professors of Mineralogy and Geology, but all the rest could be temporarily spared. The Mining Bureau Museum we could do without for a few months, for ten thousand people would see it at Chicago for one person here.

In fact it would seem to be but justice to the mining community to ship these entire collections to the World's Fair. Few people here at home, have much idea of the mining resources of the State. The newer mining States, and the more prosperous ones such as Montana, Colorado and Utah, will make strong efforts to excel in this line, while we have it in our own hands to excel them all put together.

Of course it would be necessary to send men with their collections to re-arrange them. But it would be a simple matter in view of their present condition, stamped and labeled as they are. All the gold ore, silver ore, huddling stones, quicksilver ore, borax, manganese, coal, iron, copper, etc., are not only grouped in separate cases, but there are county displays as well, showing the varied mineral products of each county. Then there are colored geological maps, photographs of mines, published reports, models, casts, etc., all relating to the mining industry.

The State Mining Bureau is intended to advertise the mining industry, and it can do no better thing in that direction than co-operate in the manner suggested. The whole collection could be in immediate charge of the State Mineralogist himself. That from the University could be under the supervision of some one connected with that institution.

As to making a special collection, that is a thing involving labor, time and expense. Moreover, it is not possible to do this as easily as in former times. The miners will not bother with collecting specimens. This State has a wider variety of mineral products than any in the Union. Several are obtained here only, and we are still the leading gold-producing region.

We have now an advantageous opportunity

which may never occur again. Our collections are large and complete, and beyond all possibility of competition. It will open the eyes of miners from other sections to see what California can show. It is greatly to be hoped that those who have the matter in charge will consider this suggestion, for it is an assured fact, if these collections can be sent, that California can carry off the palm of the mining display at Chicago.

River Mining.

In the early days of mining in this State, river-hed mining was one of the most profitable forms of the industry. Nearly all the rivers of the Sierra, in the gold belt, were worked more or less where the circumstances permitted. Of late years this industry has been confined more to the northern rivers, such as the Klamath, most of the main rivers and tributaries in the central part of the State having been pretty well worked out. Some extensive enterprises, however, have been inaugurated for working large tracts of river-hed, but no startling success has been met with so far. These are tunnel or flume schemes by which the entire water of the river is diverted from the bed for some distance and are different from the ordinary wing-dam plan by which the bed is usually got at. In some seasons, when the water runs unusually low, the river miners reap a rich harvest; on other occasions they are apt to lose all their mining appliances and the fruits of their labor for the summer by a rise in the river.

It is stated by the Grass Valley Union that river mining in the bed of the South Yuba will have a revival this season, as since the stoppage of hydraulic mining the river has scoured out along its course, and below the junction with the Middle Yuba down to the vicinity of Smartsville. This will permit the turning of the stream by wing dams, and to get down to bedrock without the removal of large deposits of gravel that a few years ago were accumulated along the stream from the hydraulic washings. For this reason a number of new locations were made last season, and one company, consisting of residents of Grass Valley and Pleasant Valley, located two miles of the river bed below Bridgeport, doing the necessary work to hold the ground, and this year it is proposed to turn the river and carry on systematic operations. A portion of the ground has never been thoroughly worked, and the locators are confident that they have ground that can be worked to a good profit. The river is yet too high to commence work, but in four weeks more it is intended to start in for the season, as by that time the water will have fallen sufficiently to commence the construction of wing dams. It is the common belief that there is plenty of gold in the bed of the Yuba that can be taken out to a good profit by those who understand river mining.

Tail-Ropes.

Percy's "Engineering in Collieries" says that when an engine is fitted with a cylindrical drum has a clear shaft, and a sufficiently deep shaft, good results are obtained by placing a tall or balance rope under the cages. But with any other drum, and when the shaft is full of pipes, etc., and when the sump is not sufficiently deep, tail-ropes are not advisable.

Mr. C. F. Clark, of the Garwood Coal and Iron Co., Victoria, gives the Mining Commissioners the particulars of the pulley arrangement applied to his works, and shown in the cut on this page. The pulley on the sump, under ordinary circumstances is stationary, but is free to move up or down as may be required but it is very effective in keeping the balance rope right. The tail-rope makes the load uniform, but adds very seriously to a somewhat tender part of the winding rope—namely, the capping with the usual winding arrangement the load upon the capping is the cage and tubs and fuel and this load is constant.

But with the tail rope arrangement we add to the load upon the capping the entire weight of the tail rope, which may amount to as much as the load itself. Mr. Clark made some experiments years ago, with and without the tail rope and found an unquestionable gain with it. The engines started their load with a lower pressure of steam, and a winding could be made with the same pressure of steam in considerably less time. But the particular shaft

was not convenient for the appliance. Water had to be wound very often with a tank swung under the cage, and there were many landings, pipes, etc., on the shaft, which made it scarcely safe to have a tail rope dangling about. The diagram shows the general arrangement of the balance or tail rope and pulley in the snmp. Chains instead of ropes are sometimes adopted and they need no pulley in the snmp, form no loops and work very steadily.

Preventing Dust Loss in Furnaces.

Joseph L. Gironx of Jerome, Arizona, has just patented through the MINING AND SCIENTIFIC PRESS Patent Agency an improved ore-roasting furnace the object of which is to pre-

any material falling upon it will automatically slide down toward the front.

At one corner of this dust chamber is an outlet stack which leads upwardly from the chamber in a vertical direction and serves for the discharge of the products of combustion after they have entered the chamber through the supplemental stack. At the bottom and front of the chamber is the fine-dust feed-opening, leading into a spout, the opposite end of which discharges into the furnace again. This feed-spout is about two and a half feet wide by four inches deep where it opens out of the dust chamber and about two inches deep where it delivers into the furnace, so as to prevent any special draft through this passage.

Ore is fed into the furnace in the usual way,

Lansell's Balance.

On May 16th, we gave in the PRESS illustration of Lansell's mining balance which is for the purpose of equalizing strains on winding gears such as are used on mining shafts. The invention consists mainly in coupling the auxiliary winding drum or spider to the shaft of the main winding gear, and on attaching to this auxiliary drum or spider a rope or chain of increasing weight to act as a counterpoise to the cage and hoisting rope. This rope or chain hangs down either the pump shaft or down a blind shaft or bore-hole, adjacent to the winding gears.

This invention can also be applied to an elevator for office buildings or warehouses.

Columbian Exposition Buildings.

(Continued from page 385.)

very near the shore of Lake Michigan, and will be almost surrounded by the lagoons that lead into the park from the lake. The building is to be 500x800 feet, its longest dimensions being north and south. The north line of the building is almost on a line with the south pier leading out into the lake, on which heroic columns, emblematic of the 13 original States, will be raised. The general cornice line is 65 feet above grade. On either side of the main entrance are mammoth Corinthian pillars, 50 feet high and 5 feet in diameter. On each corner and from the center of the building, pavilions are reared, the center one being 144 feet square, and those at the ends 64 feet square.

The main entrance leads through an opening 64 feet wide into a vestibule, from which entrance is had to the rotunda, 100 feet in diameter. This is surmounted by a mammoth glass dome, 130 feet high. All through the main vestibule, statuary has been designed illustrative of the agricultural industry. Similar designs are grouped about all of the grand entrances in the most elaborate manner. The corner pavilions are surmounted by domes 96 feet high, and above these tower groups of statuary.

Inside, broad staircases lead to a gallery 28 feet wide that extends around the building. About 400,000 feet will be available in the building, and by the widening of the gallery, 90,000 square feet of additional space may be secured.

The State of Illinois, being the host, and having made the largest appropriation of any of the States, will have a specially fine building. The structure in the main is 160 feet wide by 450 feet long, with the school-house about 75 by 60 feet, taken out of the east end and within the building. The dome will be 72 feet in diameter and about 200 feet high, with a lookout about 80 feet high and another in the lantern about 175 feet high. The side walls are 47 feet high, while the centre wing on the south will be 72 feet high, and both ends 54 feet, with a still higher projection in the centre.

On the north the Memorial Hall will form a wing 50 by 75 feet, while on the south will be placed the executive offices in a wing 75 by 23 feet, carried up three stories, with a public hall in the third story. In addition to these offices there are to be others in each of the four corners for the departmental officers. The building is to be embellished with fine carving and statuary, the material to be cast blocks of some approved composition. In front of the entrance there will be stone terraces with railings, statues, and stone steps leading down to the roadway.

California Pig Tin.

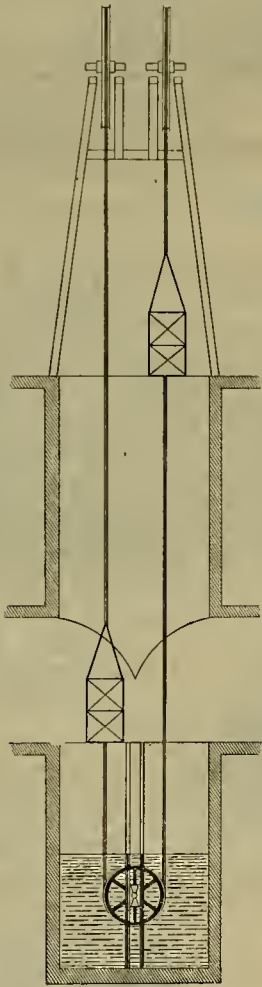
The first shipment of American pig tin, consisting of 207 bars, weighing about 56 pounds each, is now in this city for sale. With the quantity previously sent for exhibition, there are now about seven tons on hand. This all comes from the Temescal mines belonging to the San Jacinto estate, Limited, San Bernardino county, California.

This announcement is a very important one, since it proves the advent of a new branch of the mining industry in California and in the United States. Both California and Dakota have deposits of tin ore, but this State is the first one to put the metal on the market on a commercial basis. The amount is small, it is true, but the company expects to be able in a year hence to turn out 2500 tons of pig tin per annum. When it is known, however, that the average tin product of the world is only about 9000 tons, the advent of a new producing region is of recognized importance.

The only drawback to the satisfaction which we should all have in seeing this new California product is the knowledge that the mines from which it comes are under English ownership. The mines belonged to Americans in this State for many years, but were never developed, owing to litigation mainly. When legal ownership was finally determined, the mines passed almost immediately into the hands of an English corporation, which is now developing them. American capitalists do not seem to interest themselves in tin mines, and the Dakota people expect their needed assistance from across the ocean.

It remains now for Dakota to follow suit and ship pig tin in commercial form. Little specimen blocks have been shown for some years—in fact, both the California and Dakota mines were scarcely believed in because they had been so long known and showed so little result. California has now proved its position in a practical manner. The Temescal mines have tin for sale and more coming. Now let us hear from Dakota.

ARRANGEMENT OF BALANCE ROPE & PULLEY



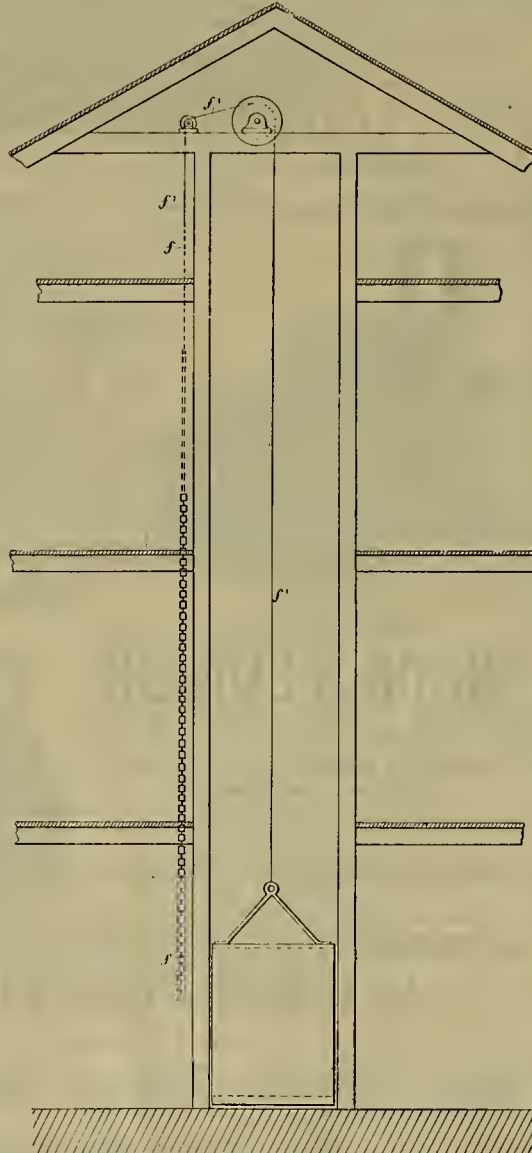
ARRANGEMENT OF TAIL-ROPE AND PULLEY.

cipitate and automatically return the lighter dust particles into the furnace and prevent their being carried away and lost by the draft through the stack. The main stack extends up from the body of the furnace in the usual manner, and is provided with an ordinary cover or damper, by which its top may be closed. On starting up and until the furnace is in condition for operation, a free draft passes through this main stack; but when work is commenced, the cover is closed so as to prevent any more draft through the stack.

An inclined supplemental stack extends outward and upward from the side of the main stack, and its mouth opens into a chamber situated at a suitable distance from the furnace, and in such a position that the supplemental stack opens into it at or near the center. This chamber is about ten feet square on the top, having the front upward of 11 feet in height, and the rear wall about four feet, the supplemental stack leading through an opening into the front. The bottom of this chamber is inclined sharply enough by this construction, so that

and, the cover being closed upon the main stack, the products of combustion will pass through the inclined stack into the large dust-chamber where the draft through the supplemental stack will be so deadened and reduced that any dust which may have been carried up through this stack will be deposited upon the inclined floor of the chamber, and this dust will, by gravitation, slide down the floor and through the dust-passage so as to be again delivered into the furnace to be properly roasted. By placing the outlet stack in the chamber out of line with the supplemental stack the continuity of draft through these two is broken, and the dust is delivered into a comparatively quiet atmosphere in the chamber, which allows it to be deposited, and returned automatically as described.

The Bragg Manufacturing Company of California has begun suit for over \$750,000 damages against the cities of New York and Brooklyn for alleged infringement of a horse-releasing device patent obtained by Robert Bragg.



BALANCE FOR ELEVATOR CAGES.

The one given herewith shows the application. The rope of the counterbalance chain is simply wound in the reverse direction on the drum or main shaft of the winding gear in a manner so that its whole weight will act as a counterbalance to the rope and cage.

THE EXTENSION DRIFT MINE.—From a private letter, we learn at the Bald Mountain Extension drift mine, Sierra county, the new dump and reservoir will be completed in a few days, when gravel will be washed in quantities. This will afford the long-waiting stockholders, who have been paying assessments some years, an opportunity to obtain handsome dividends at last. Already a large price is offered for the stock, but the owners prefer to await dividends. A large boarding-house will be put up as soon as the working crew is sufficiently increased to warrant it. The owners of this claim have been patient and persevering, as it has taken a long time to develop it properly, and many thousands of dollars have been expended. From this time on, regular dividends are expected.

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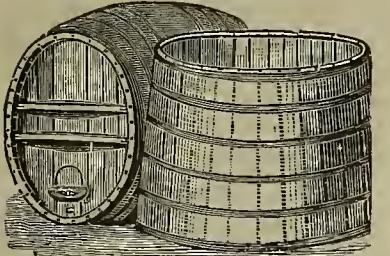
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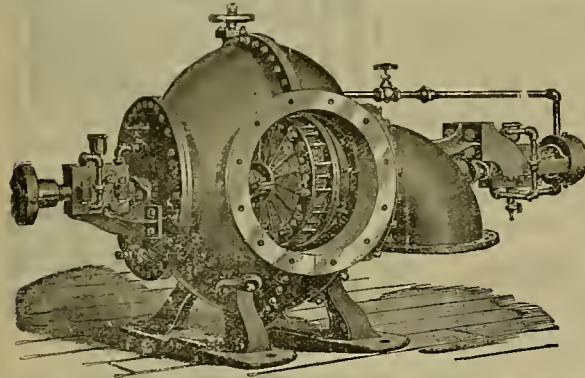
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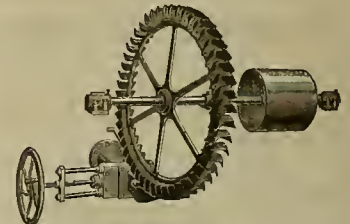
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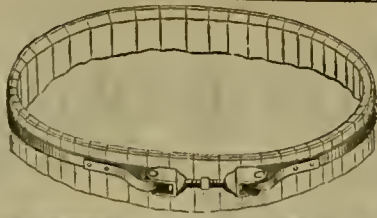
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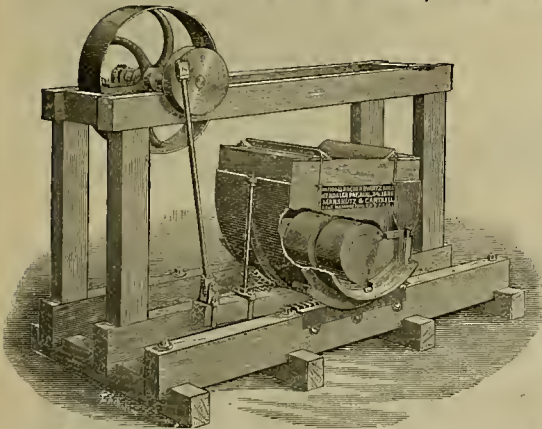
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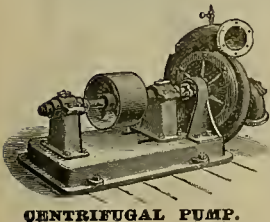
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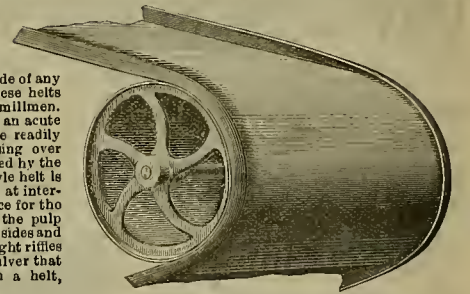
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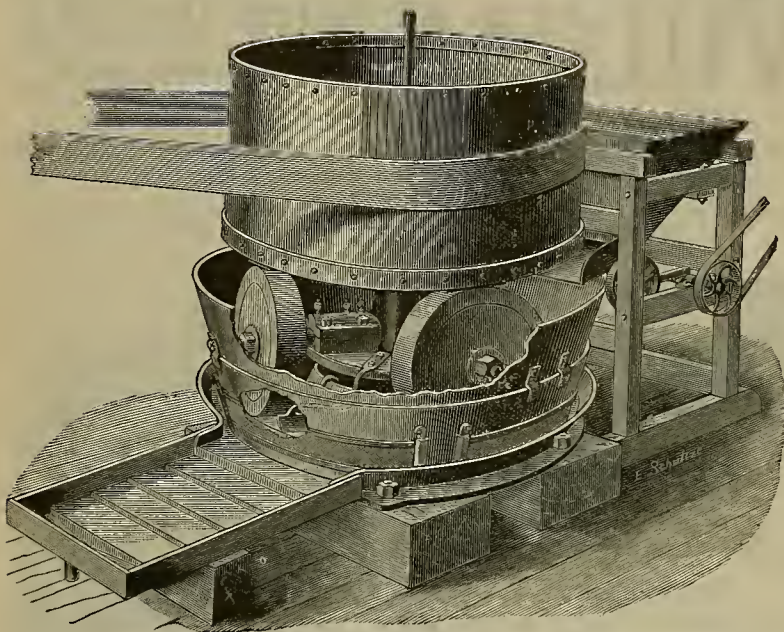
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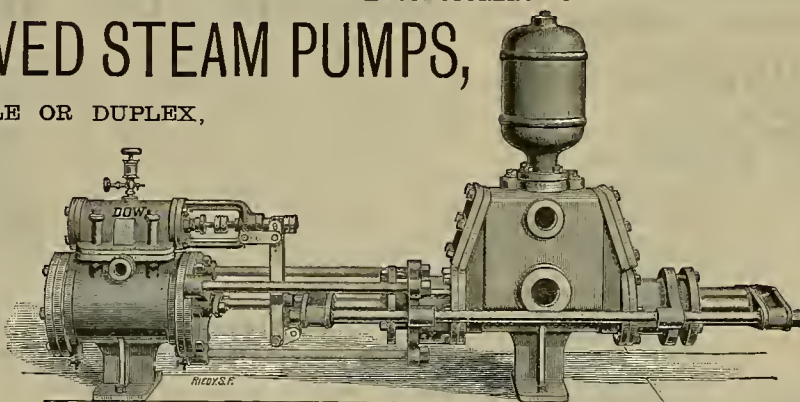
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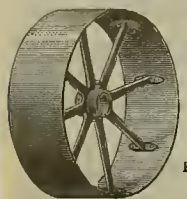
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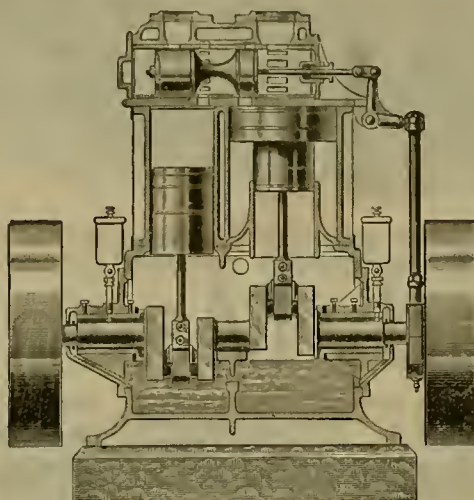
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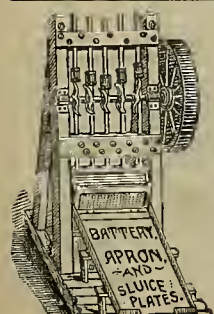
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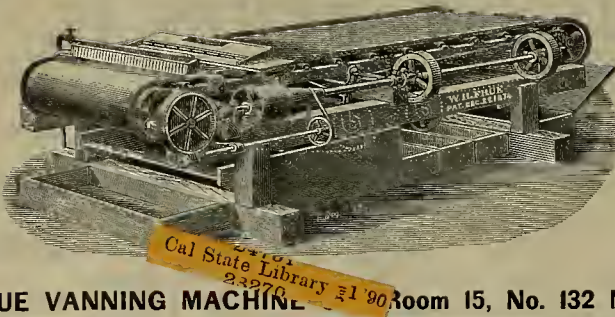
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Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1886.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

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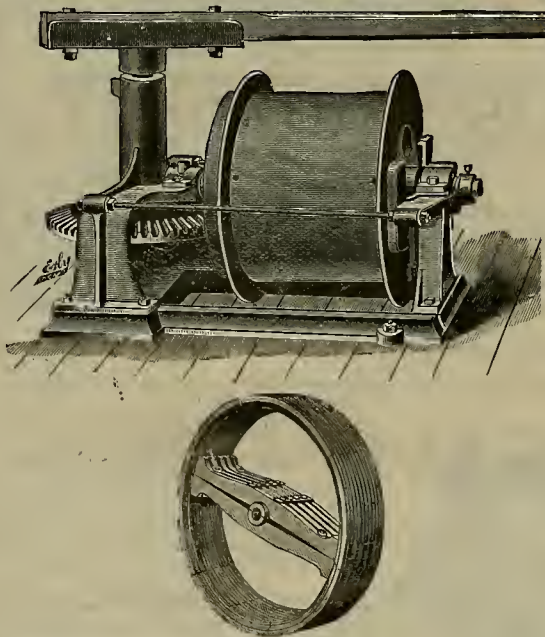
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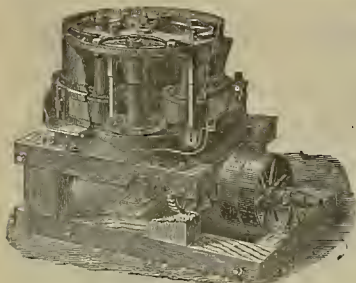
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STAMP SHOES.



STAMP DIES.

Adamantine Shoes and Dies

—AND—
CHROME CAST STEEL

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Special attention given to the purchase of Mine and Mill Supplies.



Stamp Cam.

MINING AND SCIENTIFIC PRESS.

An Illustrated Journal of Mining, Popular Science and General News.

VOL. LXII—Number 26.
DEWEY & CO., PUBLISHERS.

SAN FRANCISCO, SATURDAY, JUNE 27, 1891.

Three Dollars per Annum.
SINGLE COPIES, 10 CENTS.

Gyrating Screens for Coal.

Anthracite coal as it comes from the mine is not marketable. The "run of the mine" cannot, as in the case of bituminous coal, be sold. It is deemed important to have the lumps of as nearly uniform size as possible and also to make as large a number of different sizes as can be produced without too great expense. It is essential to remove all dust, which depreciates the value of the coal on the market; and the impurities, such as slate, etc., must also be removed. For sizing the coal there are used fixed or movable bars and fixed or movable screens. The movable screens are among the most important parts of a breaker. They are of two types. In the first type the screening surface forms a cylinder and revolves about its axis. In the other type the screening surface is approximately horizontal, and the motion and action very similar to that of an ordinary hand-screen. In many cases the screen is moved back and forth in an approximately horizontal plane. In other cases the horizontal screen receives a gyratory motion, like the motion a molder gives to his sieve when screening his sand. This type of screen is used in the Iron breaker at Drifton Collieries, Pa., and has been described by Eckley B. Cox before the American Institute of Mining Engineers.

Both the single and double gyratory screens are shown in the accompanying cut. The great advantage of this form of screen is, that the whole surface is constantly in action, while in the revolving screen of say five feet in diameter, only about eight inches of the entire circumference is at any one time in action. The problem of constructing a gyrating screen, when it is to be large and must make a great number of sizes, is to support it in such a manner that it will gyrate easily and safely, and at the same time that it will be self-contained, so that the centrifugal force will be counterbalanced and will not shake the building. This has been done successfully.

The method consists essentially in supporting one horizontal plane upon another by means

of three or more double cones, while the motion of gyration is given to the upper plates by a crank upon a shaft passing through and journalled in the lower plates. The cones roll freely in a prescribed path on the lower plate, while the upper plate moves upon the other end of the double cone, its relative motion to that of the cone being the same as that of the bottom plate. The result is that every point on the upper plate describes a circle of the same diameter (in coal screens about four inches), but no two circles have the same centers.

The cones are guided in various ways which the cuts explain. In one form on the upper and lower plate there is an annular V-shaped track, which fits into a corresponding groove in the cone. In another form the guiding is done by an annular groove in the running plate and

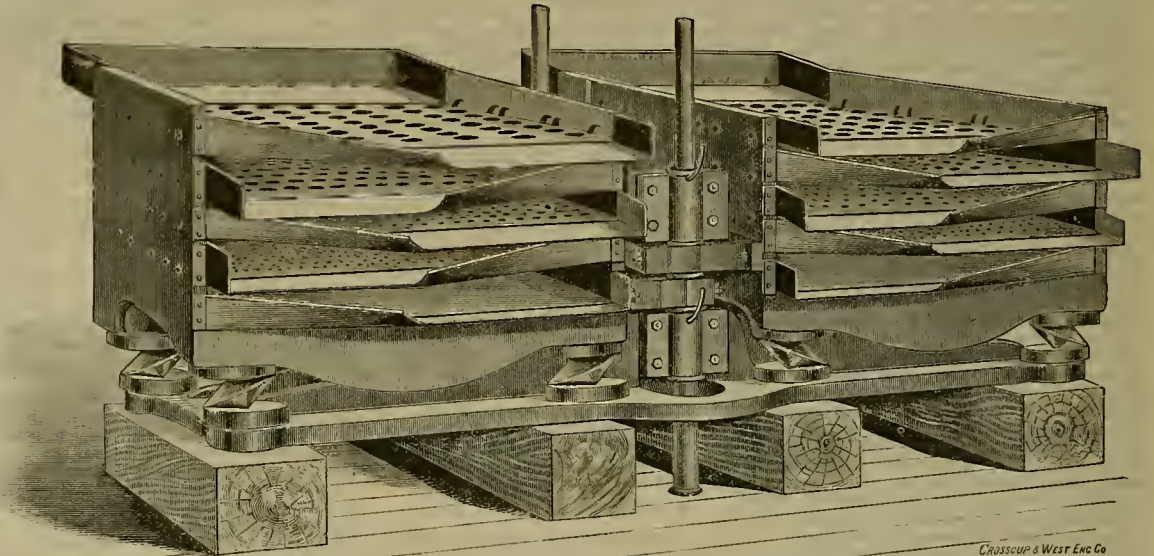
a corresponding annular enlargement of the cone at the outer edge. In two other types the guiding is done by a ball and socket joint at the two points of the cones. All these forms work well in practice.

A large number of the single gyrating screens are running at the Cross Creek collieries. The screen box is four feet wide and six feet long giving 24 square feet of screen-surface per shelf. From two to six screens are used. The smaller the size of coal the closer are the shelves put. The boxes are from one to two feet deep. The double gyratory screen did not at first work so well, as it was found that when the number of gyrations per minute exceeded 110 to 120, a very serious shaking set in. It was also found that the best results required from 140 to 145 gyrations per minute. Therefore, a comparatively light counterbalance was put on a shaft connected to the outside of each box, which removed the difficulty and allowed the screens to run smoothly at the required speed. About 20 different sizes of holes have been used with coal to suit different circumstances. There is no clogging of the holes, their circular form and the tendency of the pieces of coal to move in a small circle, cause the holes to clean themselves without difficulty.

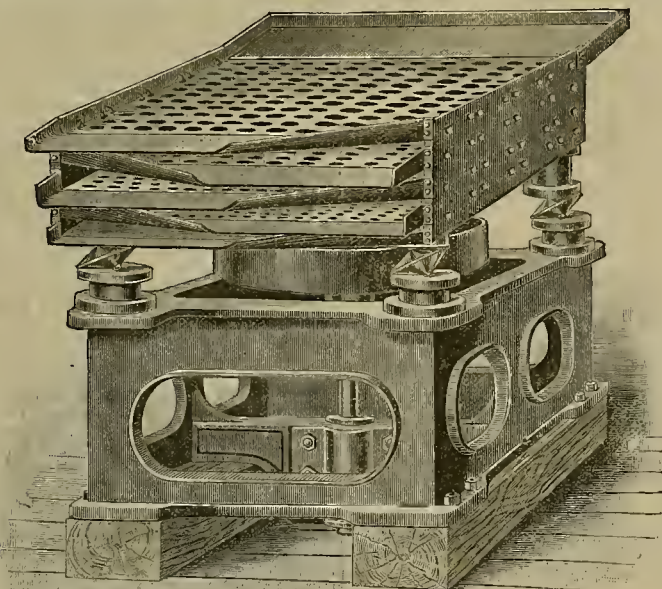
Mines on Odd Sections.

One point made by Judge Sawyer in his decision concerning the railroads and mineral land in Montana is a very strong one. He says in effect that the time at which the land must be known to be mineral, in order to exempt it from the railroad grant, must be fixed somewhere, or else a title to a given tract that might be found to contain minerals at any time in the future would be insecure and valueless. The principle conveyed here is doubtless correct. Judge Sawyer holds that the time fixed by the present law is the date at which the map of definite location was filed and accepted. Whether the Supreme Court will sustain him in this view remains to be seen.

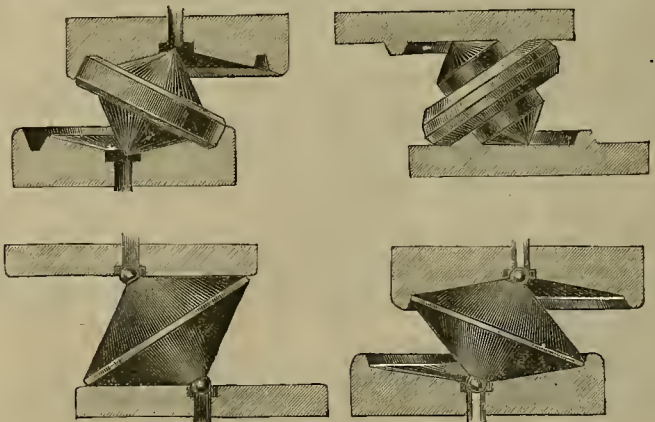
The people of Montana are anxious to have a final definite decision from the Supreme Court of the United States settling this matter of ownership of mineral land on odd sections. If it is finally decided in favor of the railroad, the company will own immense tracts of mineral land and the miners must buy from them. This is the case in certain parts of this State where there are drift mines. It is to be hoped that the Montana people will force some suitable case to issue in the highest court.



FRONT VIEW OF DOUBLE GYRATING SCREEN.



SINGLE GYRATING SCREENS FOR COAL.



CONES FOR MOUNTING GYRATING SCREENS.

A Lixiviation Plant.

NUMBER II.

[Read by C. A. STREBELT, San Francisco, before the American Institute of Mining Engineers.]

5. Apparatus for Raising Stock-Solution to the Storage-Tanks.

Plunger-Pumps.—Pumps of the Knowles type, as made and kept in stock by manufacturers, are not durable in contact with byphosphite solutions, none of the metals or their alloys resisting its corroding action. To make such pumps durable, valves, valve-seats and plungers should be made of hard rubber or glass. It is difficult to induce manufacturers to take such orders except at extravagant prices. The same objections apply to centrifugal and rotary pumps.

Pumps of the Koerting Type.—Such pumps must be made of material not affected by the solution. Their principal objection is the dilution of the solution by condensed steam.

The Geyser Pump.—If into a pipe, open at both ends, and immersed in a well, compressed air is introduced at the lower end, the solution in the pipe rises and is discharged, together with the air, at the upper end. The invention of this pump dates back several centuries, and it has recently received from Dr. Werner Siemens the appropriate name, "Geyser Pump." In the *Engineering and Mining Journal* of December 28, 1889, I have fully described it as Pöhle's Air-Lift Pump, and, on the basis of the investigations of Messrs. Behr and Browne, of San Francisco, recommended its introduction in lixiviation-works. After I had made actual working-plans, however, for its introduction, some disagreeable features presented themselves, so that its application for raising stock-solution was abandoned. The objections consisted principally in the necessity of sinking a well, 30 feet deep, for the submergence-pipe, and in supporting a vertical solution-pipe, 85 feet high.

The Montejus System.—A Montejus is an iron tank from which a solution is raised through a pipe by admitting steam or compressed air above the solution. (For protection of the inside, see 13.) With steam, the tank should be in the shape of a long cylinder of relatively small diameter, standing upright, to avoid condensation as much as possible. With compressed air as motive power, the shape of the tank is not material. It is then best to place it so that the axis of the cylinder is horizontal. One of the heads of the cylinder is put on with bolts and a gasket, so that the interior can be easily coated with an asphaltic compound.

These tanks have two openings; one at the bottom, through which the tank is filled and discharged by a three-way cock, connected with the pipes leading to the solution-sump and the storage-tank; one on the top, through which air escapes while the tank is filling, and steam or compressed air is introduced to elevate the solution, which changes are also effected by a three-way cock.

For works of large capacity, two Montejus are placed side by side below the solution-sumps, so that one is filling while the other is discharged. They should hold about 200 cubic feet. Convenient dimensions are: four feet diameter and 16 feet in length, or 4½ feet diameter and 14 feet in length, with solution-pipes from three to four inches diameter.

For large works, compressed air deserves decidedly the preference. The size of air-compressor, which should give about 30 pounds pressure per square inch, is the same for a geyser-pump as for a Montejus of equal capacity.

Although the effect of compressed air is better if applied to a geyser-pump than to a Montejus, the difference plays no important part in economy, while the original outlay for installation is in favor of the latter.

6. Apparatus for Increasing the Rate of Lixiviation.

Suction-Hose.—The means hitherto employed for increasing the rate of lixiviation, have been to give the hose of the solution-outlet below the filter of the ore-tank great length, and discharge the solution at considerable depth below the tank, taking care that the hose remains filled with solution, and creates a suction by the weight of the solution-column. This method is objectionable, not only because it is difficult to get rid of all the air below the filter, but also for the reason that the solution has to be raised again to the precipitating-tanks, unless a very steep mill-site permits their position much below the ore-tanks.

Pumps.—These are not recommended for reasons given in section 5.

Koerting Ejectors.—A Koerting ejector is effective provided it is not made of material liable to be corroded by the solution. The lead-lined ejectors, sold by A. Allen, New York, are not durable; even the platinum steam-nozzle wear out. Ejectors of porcelain, with hard rubber steam-nozzles, are manufactured by the Koerting Brothers, Hanover, Germany. The great objection to a Koerting ejector is, however, the dilution of the solution by condensed steam. The apparatus also acts intermittently, unless carefully regulated to meet the capacity of the filter.

Montejus.—The best effect is unquestionably produced by a Montejus. For this purpose the opening at the bottom is connected with a pipe through which, by a three-way cock, the solution either runs in from the hose at the bottom of the ore-tank, or is raised to the landers in communication with the precipitating-tanks.

The outlet on top has a pipe with a three-way cock, through which compressed air can be introduced for raising the solution, or a suction is created by a Koerting vacuum-pump for filling the tank, or communication is shut off both from the air-compressor and vacuum-pump, provided the apparatus is idle. Only one Koerting vacuum-pump, producing a vacuum of 68 cm. quicksilver, is needed for a number of Montejus tanks, the latter being all in communication with a pipe, at the end of which the Koerting is placed.

These vacuum-pumps are best obtained from the Koerting Brothers, Hanover, Germany.

Necessarily, the operation of the apparatus is intermittent, but the discharge of the Montejus takes such a short time that this is not detrimental.

7. Apparatus for Circulating Extra-Solution.

In circulating extra-solution of standard composition, only a quantity is used sufficient to saturate the charge in the ore-tank, and this is allowed to filter repeatedly and continuously through the ore. As will readily be seen, the Montejus system cannot be used for this purpose. Here we must rely either upon a Koerting ejector, made of porcelain, or use the geyser-pump. Which of the two deserves the preference is doubtful, the geyser pump being untried. Their respective advantages and disadvantages may be stated as follows:

With the Koerting there is risk of decomposing extra-solution with formation of sulphates and CuS₂, the solution coming in contact with the hot steam, and of weakening the solution by dilution. The heating, however, is beneficial. Circulation is also quicker by material increase of the rate of lixiviation.

In the geyser-pump, the extra-solution comes in contact with air only whereby it may deteriorate through the conversion of the sodium hyposulphite into tetrathionate, but without affecting the onerous hyposulphite. By this reaction, and by the evaporation of water, the extra-solution will gain in concentration. On the other hand, the solution will be redosed in temperature, and circulation will be slower, because the rate of lixiviation will not be materially increased, even by taking the submergence-pipe as long as practicable. The original cost of installation, and the expense of running, would hardly enter into calculation. Only an actual comparative test can decide which apparatus is the better.

8. Filter-Press and Press-Tank.

For lixiviation-mills of various capacities I recommend Johnson's filter-press, with 24 to 36 chambers, 15 to 18 inches in diameter, without distance-rings and with closed delivery. Closed delivery obviates the necessity of having a sump below the press, the solution being at once raised to the main solution-sump.

If it is desirable to free the precipitates from adhering stock-solution, for reasons given in my paper on, "Refining of Sulphides," a filter-press should be used in which the cakes can be washed after the chambers have been filled.

The chambers are of cast-iron, with a coating of asphalt varnish, which should be occasionally renewed.

The proper way of charging the filter-press is by a press-tank. In Mr. Daggett's paper, (*Trans.*, XVI., 438.) a press-tank is illustrated and described, constructed for steam-pressure. For works of large capacity, steam should be replaced by compressed air. In the latter case the wooden diaphragm and the pipe extending to the bottom are superfluous, and the precipitates are discharged through an opening in the side of the tank near its top.

The construction, as shown in the cut, is not recommended. The bottom as well as the top should be made of boiler-iron or steel-sheet, not of cast-iron. At the Marsao mill, one of these tanks exploded, by breakage of the cast-iron bottom, at a pressure of 80 pounds. For compressed air the tank should be constructed to be safe for 150 pounds pressure to the square inch.

9. Drying-Chamber for Precipitates.

A drying-chamber for sulphides and other precipitates, is illustrated in the paper just cited, pp. 440 and 443. Its construction is contrary to all rules for a good system of drying by hot air. A chamber of this kind, in use at the Marsao mill, has a very low efficiency. Correct principles of construction are to heat the air by a coil of steam-pipes, in a separate chamber attached to the dryer, to allow the heated air to enter the drying-chamber at the top, and circulate downward between the iron pans charged with precipitates, and finally to withdraw the moist air at the bottom by a Koerting steam-jet ventilator. Upon these principles all modern apparatus for desiccation is constructed.

The outlet of the steam-pipe may be either connected with a steam-trap or with the mud-drum of the boiler. The latter can only be done if the boiler is so located that its mud-drum is lower than the outlet of the coil. In this case the coil works on the gravity principle, the most economical method of utilizing the heat of the steam. The coil should be tested for leakage at a pressure of 80 pounds.

(To be Continued.)

DELICATE HEAT MEASURES.—The degree of delicacy which has been attained in the application of the radio-micrometer for the measurement of radiant heat, viz., from a candle, a fire, the sun, the moon, the stars, or anything

else which radiates heat, through space, is marvellous. An appreciable effect is produced on the radio-micrometer by a candle placed two miles away, at which distance its light is almost comparable to that of a barely visible nebula. The latest measurements by Prof. Bays show that the heat of the lunar rays can be definitely determined as 150,000 times greater than those of a candle 20 feet away. The difference of radiations between a moon 19 days old, which goes through the sky with its dark edge foremost, and the nine-day moon, in which the bright edge goes forward, and the diminished heat at the terminator, as compared with the luminous part of the disc, show in a wonderful way the discriminating power of the instrument. Prof. Bays' experiments fully confirm the inference drawn from earlier observations, that the heat of the moon does not accumulate by penetrating beneath her surface; it lasts only from moment to moment, as supplied by the sun.

The Malay Gold Mines.

Consul Rounseville Wildman, writing from Singapore, contributes to the U. S. Consular, reports the following:

On Sept. 22, 1890, I gave the Department some details in regard to the newly-opened gold field at Raub, province of Pahang, Malay Peninsula, and cited the result of the first crushing of ore. On the 27th of Dec., 1890, the following telegram was received from the superintendent by the local secretary of the Raub-Australian Syndicate (limited), in this city:

KUALA KUBU, Dec., 27, 1890.

Crushing finished. Four hundred and ninety tons stone yielded 760 ounces smelted gold. Left to-day with gold for Singapore via Salangore.

BIBBY.

The above return does not average out as high as the previous one, but it is stated that the fact arises, not from any diminution in the quantity of ore, but rather from the vein running through some former Chinese diggings. The complete output of the Raub mine is at present about \$30,000 in gold.

Mr. Bibby, the superintendent, called on me to obtain data in regard to process of mining by electricity in my own State (Idaho). In conversation he informed me that the development of gold in the Malay Peninsula was but a question of a few months, and that their greatest drawback at present was a scarcity of experienced miners; that, with a corps of American miners to direct the Chinese coolies in the building of timber shoots and in the handling of the ore to the best advantage, the work could be pushed to a rapid financial success.

He further stated that the ground was of a soft shale formation, with plenty of fuel and water at hand.

They are now figuring with American firms for a 100-stamp mill, water-wheel, and electrical machinery, and hope therewith to open a section of country that will compare favorably with the old gold fields of the United States and Australia.

New Incorporations.

The following companies have been incorporated, and papers filed in the office of the Superior Court, Department 10, San Francisco:

PNEUMATIC STREET CAR CO., June 2. Object to construct and operate street cars, propelled by pneumatic power. Capital stock, \$500,000. Directors—J. J. Scriver, L. C. Pressley, W. S. Lott, C. A. Henry and C. E. Staples.

SAN ANTONIO M. CO., June 3. Location, Mexico. Capital stock, \$2,000,000. Directors—I. C. Stump, Lloyd Tevis; L. T. Haggin, T. J. Schuyler and F. G. Dunn.

GUANACERO M. CO., June 3. Location, Mexico. Capital stock, \$2,000,000. Directors—I. C. Stump, Lloyd Tevis, L. T. Haggin, T. J. Schuyler and F. G. Dunn.

ASSURED MUTUAL BUILDING AND LOAN ASSOCIATION OF SAN FRANCISCO, June 3. Capital stock, \$2,000,000. Directors—D. L. Randolph, H. M. Black, T. R. Bannerman, D. Sheerin, W. E. Reardon, B. J. Clinch, J. J. O'Farrell, J. J. Tobin and J. F. Sheehan.

LIVE STOCK GAZETTE PUBLISHING CO., June 3. Capital stock, \$50,000. Directors—R. J. Crist, J. A. Crist, A. D. Bell, E. Heymans and J. E. Slinkey.

TULLER G. M. CO., June 3. Capital stock, \$500,000. Directors—D. W. C. Morgan, R. E. Wilson, S. C. Mills, R. M. Anthony and C. F. Liege.

IMPERIAL JEWELRY CO., June 3. Capital stock, \$50,000. Directors—W. Trondorf, G. A. Treadwell, M. J. Morley, and Jno. C. Rice.

PAVILION ROLLER SKATES CO., June 3. Capital stock, \$25,000. Directors—L. Glass, B. W. Bales, J. Wreft, C. W. Nevin and F. T. Carroll.

RAPID SAFETY FILTER CO., June 6. Capital stock, \$150,000. Directors—R. H. Lloyd, C. L. Ackerman, W. D. Mansfield, Chas. Hart and Albert Cerf.

WOMAN'S CLUB FOR PHYSICAL CULTURE. Directors—Abby P. Cheney, Alice Hastings, Joanna M. Wright, Mary P. Murphy, Hattie M. Morton, Minnie C. T. Love, Ida F. Davis, Helen A. Carter and Fannie W. Bancroft. No capital stock.

FRANCO-AMERICAN WHALEBONE CO., June 6. Capital stock, \$1,000,000. Directors—J. B. Bernstein, M. S. Eisner, James M. Seawell, Thos. E. Ryan and Max Blum.

POSO CREEK FRUIT CO., June 6. Capital stock, \$32,000. Directors—T. K. Stetler, Chas. L. Patton, W. R. Smedburg, Wm. E. Lutz and L. P. Bolander.

PACIFIC UNION-ALLIANCE PUBLISHING CO., June 8. Object, to conduct a general publishing company in S. F. and San Jose. Capital stock, \$50,000. Directors—J. W. Hines, Wm. M. Lang-

ton, J. K. Phillips, P. R. Martin and Geo. E. Hines.

JUDSON DYNAMITE AND POWDER CO., June 13. (Oakland.) Capital stock, \$2,000,000. Directors—Egbert Judson, Thos. Bell, J. B. Randol, M. W. Balshare and John S. Doe.

WESTERN FUSE AND EXPLOSIVE CO., June 13. Capital stock, \$50,000. Directors—Egbert Judson, Alonzo Hayward, E. G. Lukens, Gustav Sutro and L. L. Brownell.

LIGHTNING FILTER CO., June 16. Capital stock, \$350,000. Directors—L. T. F. Walter, C. J. Carroll, H. Adams, R. Drew, J. W. Sperry, H. Wells and Frank Dalton.

CALIFORNIA INVESTMENT ASS'N., June 13. Capital stock, \$200,000. Directors—A. M. Cor, J. C. Quinn, C. F. Curry, W. L. Stowell, E. W. Peabody, F. A. Kinne and D. S. Richardson.

CALIFORNIA EXCAVATING AND CONTRACTING CO., June 13. Capital stock, \$1,000,000. Directors—J. H. L. Turk; L. C. Parke, F. Homer, E. E. Tucker and S. W. Elliott.

DROBAZ FISHING CO., June 13. Capital stock, \$100,000. Directors—M. Drobaz, J. Morizio, T. J. Monahan, A. Francovich and A. Mikulich.

Machinery for Handling Gravel.

Working Auriferous Material in Australian Drift Mines.

The Chiltern Gold Mines Co. has, owing to its success and the magnitude of its operations, always occupied an important position, contributing largely to the prosperity of Chiltern district, Victoria, Australia. They first began to use steam machinery in this field as far back as 1860, and several companies sunk shafts. From a length of 2420 yards eight companies took out \$250,289. Moreover, very large quantities of gold were also obtained in the dry workings on the Chiltern lead and tributaries of which there is no record.

The Sons of Freedom claim was registered in July, 1860, in the names of 32 shareholders, who obtained dividends amounting to £16,000. It was subsequently formed into a public company under the name of the Extended Sons of Freedom Co., and very profitably worked under the management of Mr. Henry Nickless. To convey an idea of the judgment and care that must have been exercised to enable him to carry to fruition the responsible duties attached to the position, it may be mentioned that the mine in a few years yielded gold to the value of £161,900. In the year 1870 an amalgamation was effected with adjoining claim-holders, and a new company organized under the style of the Doma Mungli Gold Mining Co. New and more powerful machinery was obtained, but, unfortunately, through an error of judgment it was erected in a wrong position. The continuation of Chiltern lead was not discovered, and although a considerable quantity of gold was obtained, to the value of about £137,328, the ultimate result was most disastrous to the shareholders, and the entire property passed into the hands of the Hon. J. A. Wallace and a Melbourne syndicate. The machinery was removed, and the claim has been most successfully worked of late years under the able management of Mr. John Cook. The quantity of gold obtained from the 4th of August, 1877, till the 15th of October, 1889, was \$2,022,021.64wt. Forty dividends were declared during that period, amounting to £77,905. The claim is held under miners' rights, and is fully 1600 acres in extent. It comprises the outlet of an area of about 72 square miles of auriferous country. Bounded on the north and south by schistose ranges, it occupies the narrowest portion of the valley of the Black Dog Creek; through it all the mineral leads originating in the surrounding country must necessarily trend toward a main channel.

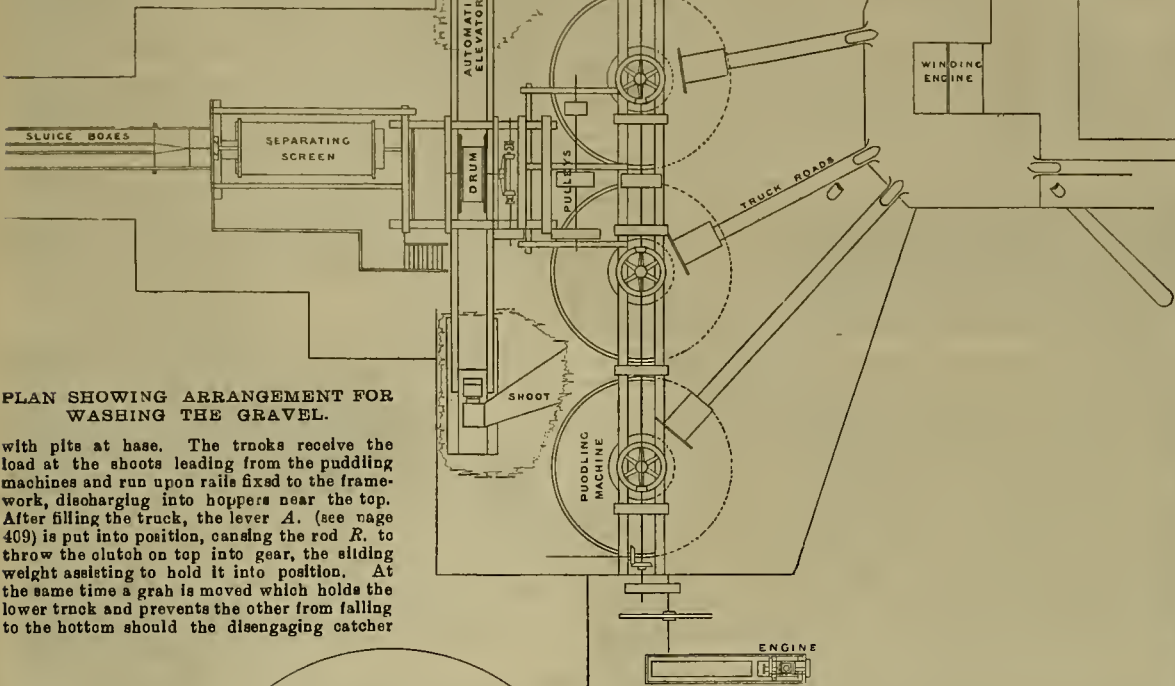
Comparatively little of the 23,100 feet of the total length of the company's claim has yet been worked. The lower portion of the workings present strong indications of drifts peculiar to the valley and principal sources of the Black Dog creek. Previous workings are supposed to have been exclusively confined to the extension of the Chiltern lead, which originates in a purely schistose country, while the rock formation of the valley referred to consists largely of granite and palaeozoic claystone and sandstone; there are also considerable areas of Silurian rock intersected with auriferous quartz veins. It is reasonable to assume considerable gold must have been carried with the detritus from the denudation of this area, and naturally augmented the richness of the lead below the present workings. In the present working shaft of the company, known as No. 2, the bedrock is 280 feet from the surface, and the depth of overlying drift or washdirt is from three to six feet, by a width of from 150 to 400 and occasionally 600 feet. About a mile and a half westward, a series of bores have been put down, where the depth of bedrock appears to be about 320 feet, overlaid by about five feet of washdirt, with good prospects of gold. The company constantly employs about 180 men, independent of wood-cutters. The yield of gold fluctuates greatly, depending on the width of lead, but the output sometimes considerably exceeds 1000 ounces per month. The method of working adopted is by means of main drives constructed in the slate and sandstone rock at a lower level than the auriferous drifts. By this system, large areas can be mined with comparative safety, without injury to the permanent workings, and the heavy expenses of new shafts are not incurred for long periods.

Besides the working shaft, there is the pumping shaft, used for drainage and ventilation purposes, also a balance shaft for sending down

timber, about 1800 feet distant from the working shaft. There have been constructed about 8000 feet of main and branch lower level drives. The machinery consists of a 21-inch cylinder pumping engine, 42-inch stroke. The winding engine is an 18-inch cylinder engine, affording efficient power to haul two trucks in each cage.

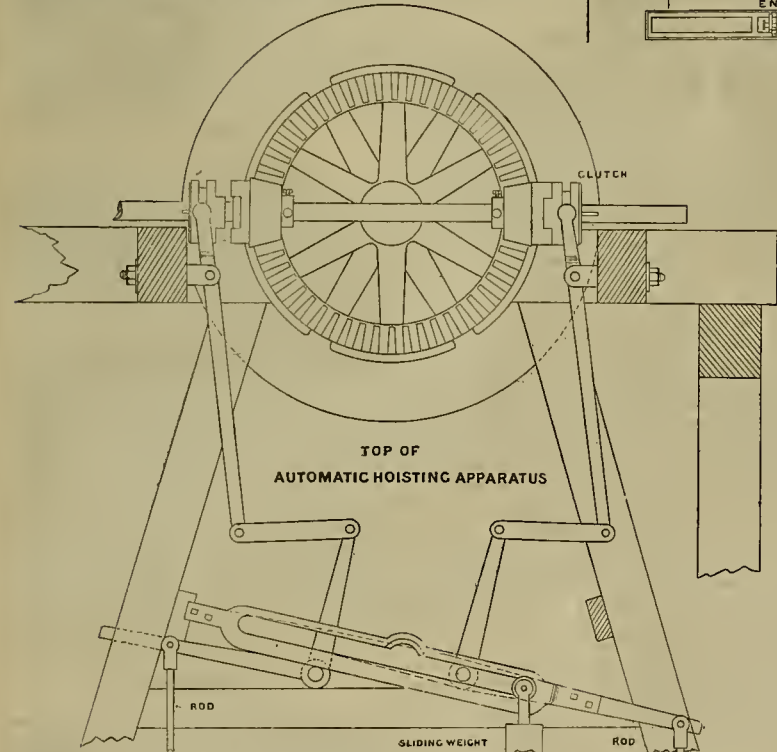
The puddling engine is 20-horse power working from puddling machines and all other machinery connected with sluicing operations. The mine manager, Mr. Cook, furnishes for the annual report of the Secretary of Mines of Victoria detailed drawings of this machinery, which are reproduced herewith on pages 403 and 404.

The automatic elevator consists of a triangular framework supporting drums, levers, etc.,

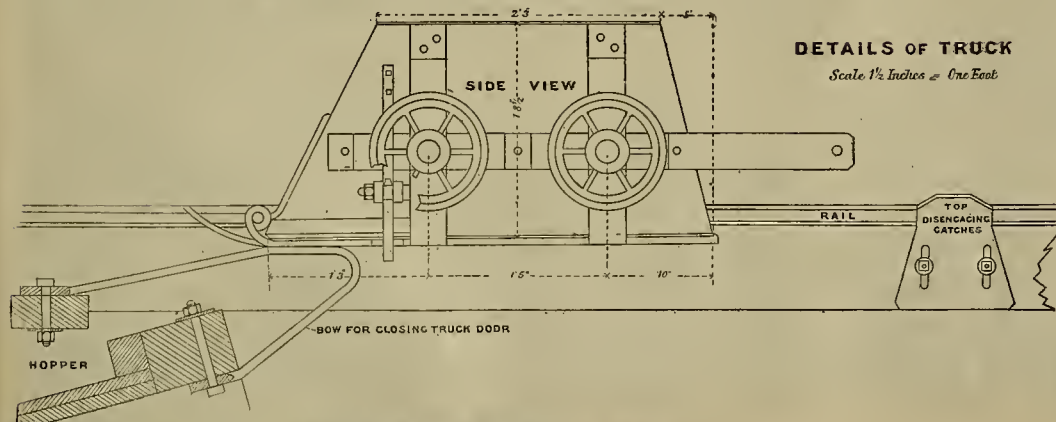


PLAN SHOWING ARRANGEMENT FOR WASHING THE GRAVEL.

with pits at base. The trucks receive the load at the shoots leading from the puddling machines and run upon rails fixed to the framework, discharging into hoppers near the top. After filling the truck, the lever A. (see page 409) is put into position, causing the rod R. to throw the clutch on top into gear, the sliding weight assisting to hold it into position. At the same time a grab is moved which holds the lower truck and prevents the other from falling to the bottom should the disengaging catcher



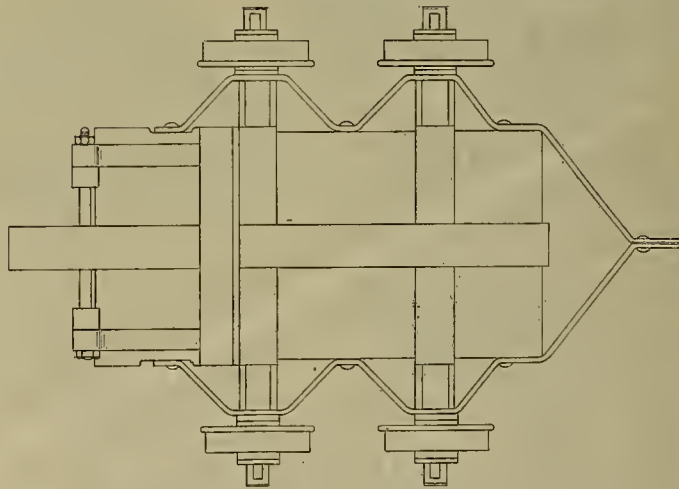
TOP OF AUTOMATIC HOISTING APPARATUS



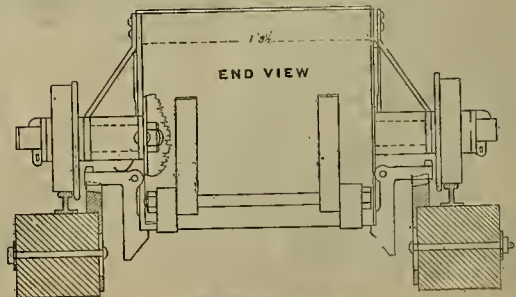
THE TRUCK FOR HANDLING GRAVEL.

DETAILS OF TRUCK

Scale 1/2 Inches = One Foot



PLAN THE TRUCK.



GRAVEL TRUCK.

fail to open the truck door. Attention is called in this case by the lower truck being held in a position too high for filling, and to release which it is necessary to first empty the top one. The door of the descending truck is closed by a wrought-iron bow attached to the top hopper. The trucks travel at the rate of 210 feet per minute.

The operation is as follows: The material on leaving the machines falls into a hopper, and is lifted at the will of an operator to a height of about 70 feet by a most ingenious contrivance. It consists of two wagon-like trucks or skips of a capacity of about 8½ cubic feet, fitted with wheels, which run on rails on opposite inclined planes, lined with sheet iron. They are attached to a wire rope wound round a drum actuated by belts from the driving shaft of the puddling machines. The skip to be filled is caught and held firmly by a grab to the outlet of the receiving hopper; the attendant then lifts a small door, and when the skip is filled he actuates a lever and it ascends and discharges its contents automatically into another hopper, the skip on the opposite side having descended to be loaded in a similar manner. The machinery works effectively, and there is little or no danger to be apprehended from accidents. A stream of water is introduced into the upper hopper, which causes the puddled washdirt to flow freely through an aperture, in such quantity as is required, into a rotary cylinder screen 12 feet in length and 5 feet in diameter. It revolves about six times per minute, and has an incline of about 1 foot in 8 feet toward the discharging end. It is constructed with rectangular steel bars, 2 inches by ½ inch in sectional area, which are easily replaced when required. The spaces between the bars are less than 1 inch, through which the detritus containing the gold falls and is carried direct to the sluice-boxes, the larger gravel, which is thoroughly washed, falling through the lower end of the screen into a large truck to be wheeled away when filled. The sluice-boxes are of iron, 54 feet in length, fitted with cast-iron riffles throughout, of a pattern that has been found by experience to answer all practical purposes for saving gold. The upper end of the boxes is fitted with perforated cast-iron plates of special construction; these and a portion of the upper boxes are secured by lock and key, from which the gold is removed daily, and the boxes are washed down every alternate day. It will be seen the entire work of sluicing is practically attended to by one man, which under the ordinary system would have required the labor of four men, thus effecting a considerable saving. The apparatus throughout is admirably arranged, and reflects great credit on the designers, Mr. John Cook, the manager, and Mr. Thos Duncan, the company's engineer. The rotary cylinder screen is simple, not costly, and as arranged it is undoubtedly most effective, and Mr. Cook certainly deserves well of the mining public for

having re-introduced with many improvements such a valuable accessory to sluicing operations. No attempt has been made to obtain a patent for the invention and improvements, which can be utilized by those who may wish to apply them.

MINING SUMMARY.

The following is mostly condensed from journals published in the interior, in proximity to the mines mentioned.

CALIFORNIA.

Amador.

SUTTER CREEK.—*Cor. Amador Ledger*, June 20: Operations have been resumed at the North Star. The shaft is being repaired down to the 600-foot level, from which point they are going to drift south, a decision which meets with the approval of all concerned. There is 150 feet yet to drift to reach the line of the Comet claim. If nothing is met with in this distance, they may conclude to run into the Comet ground, which they have the privilege of doing by paying \$1000 for each 100 feet of drift. The company have bonded the Comet for \$18,000, to be paid in installments. If nothing is struck in drifting south, they propose to crosscut west. The work the company have mapped out will take in the neighborhood of one year to accomplish. Work at the South Eureka is going ahead satisfactorily. The shaft which is 5x14 feet in the clear, is down 50 feet. The water wheels for the hoist are in place. Fifteen tons of pipe iron will be delivered in a few days from the East, and C. O. Mitchell has secured the contract to make the pipe, which will be 15 inches in diameter. Fifteen hundred feet of it will be required. The contractors, Ed. Kay and V. S. Garharini, of Jackson, have commenced building the hoisting works, and expect to get through with it in two weeks. Work at the Lincoln continues. The mill is kept going, and is about paying expenses. They are crosscutting in hope of striking something of a more encouraging character. At the Hector things are moving lively. The mouth of the old shaft is to be retimbered at once, and then the water will be taken out, and explorations below will be commenced. D. K. Valentine will remain here, and personally superintend the operations.

BUNKER HILL.—Pumping operations at the Bunker Hill have ceased, and the mine is filling up with water. This is a bad indication. It shows there is little prospect of a speedy adjustment of the difficulties, and carries the impression that the property is doomed to a lengthened period of idleness, pending the settlement of its financial difficulties. This is a severe blow to Amador. The Bunker Hill is considered a good mine, and was in a fair way, as far as its underground development is concerned, of entering upon a long career of prosperity when this unfortunate complication with the Eastern stockholders occurred.

Mono.

THE BODIE MINES.—*Miner*, June 17: The mining outlook for Bodie at present is better than for years past. More men are employed, and there is a great deal of activity throughout the entire camp. A feeling of confidence prevails, and all seem to think that this summer will be an unusually lively one. Many old Bodieites who left here years ago have returned, and express themselves as having faith in the future of the place. While Bodie may perhaps never again be as lively as it was ten or eleven years ago, there is every reason to believe that she will continue for many years to be one of the leading bullion-producing camps in the State. Below will be found a brief review of some of the principal mines.

SYNDICATE.—Here we find about 12 men employed, and the mine looking well. The mill was started up on the sixth inst, and will probably run the balance of the month. From the complacent smile on Sam Tyack's countenance it is evident that the cleanup will go a long way toward making a millionaire out of that gentleman.

THE EVA.—This mine adjoins the syndicate on the southwest and is the property of Loose & Trevathen. It was discovered by them a little over a year ago, since which time they have done a large amount of work on it. They have now out a large quantity of ore, which is being crushed at the Miners' mill. The mill has been fitted up at great expense. If pluck and energy and perseverance are deserving of success then Loose & Trevathen will surely succeed.

STANDARO.—Everything is running along smoothly. The different ore bodies in the mine are looking extremely well. The bullion shipment for May was \$21,078, and Superintendent Benedict informs us that this month it will be about the same.

THE BULWER has quite a large prospecting force at work, and if street rumors prove true the Bulwer will soon begin crushing ore again.

BODIE AND MONO.—The character of the work going on is such that an ore body is liable to be uncovered at any moment.

THE SIGOURNEY, situated on Sigourney Flat, a trifle over two miles south of the town of Bodie, is a new silver mine owned by J. B. Skewes, and one that is destined to make a stir in the mining world. The ledge in the tunnel is about three feet, and 14 assays were recently taken that showed an average of \$40 a ton. The tunnel is in nearly 200 feet, and there is considerable ore on the dump. As soon as the mill he is now building at Copper mountain is completed, Mr. Skewes intends to start in crushing ore.

Nevada.

THE NEW REDUCTION WORKS.—*Transcript*, June 17: The lead bath reduction works which recently began operations in the old Plaza foundry building, near the narrow gauge station at this city, give every promise of proving a practical success. Supt. Howe is gradually overcoming the obstacles that have presented themselves since the experimenting began, and hopes to be able shortly to announce that the process is an unqualified success. Encouraging results have been obtained so far.

POTOSI MINE.—*Grass Valley Union*, June 20: Progress is being made on the Potosi mine, on Gold Flat. The old shaft has been retimbered down to the water level. Timber is arriving for the new hoisting works. Two Pelton wheels are to be put in for hoisting and pumping. Water power will be used under a 300-foot pressure, which will be sufficient to work the mine to any depth. The old shaft is over 300 feet in depth, and it is expected to be found in reasonably good condition when the water is pumped out. Superintendent Skewes will push the work as fast as possible.

MINING ITEMS.—More rich rock was brought in from the California yesterday. The quartz showed well in free gold and gold bearing sulphurets. The

vein improves as the drift is extended. The new shaft of the Wyoming mine is down 35 feet and everything is working smoothly. Three shifts of men are engaged in the sinking.

ST. JOHN MINE.—The shaft of the St. John mine is being sunk for the 250-foot level, and the ledge continues large and the quartz of good quality. The old shaft and drifts have been straightened, and the mine is now in good working condition throughout. The company is figuring upon a mill, with a probability that one will be erected this season.

Placer.

MAYFLOWER.—*Mt. Messenger*, June 20: We learn that Oscar Jones is running the Mayflower drift gravel mine in Placer county. At a distance of 8000 feet from the tunnel mouth a shaft was raised for air. The channel has been worked nearly 2000 feet both up and down stream from the point where the lead was first tapped by the main tunnel. The company has nearly a mile of channel left on the upper end before reaching the Breese & Wheeler line. The Mayflower is paying largely.

Plumas.

NUCKET.—*Plumas National*, June 20: Thompson and Thomas picked up a \$90 piece in their diggings, one day this week, which goes to show that there are as good mines in Plumas to-day, as there ever were; all that is required is to go deeper and properly handle. We know of no better country for capital to invest than Plumas county.

Sierra.

THE THISTLE.—*Mt. Messenger*, June 20: We learn that the prospect tunnel in the Thistle shaft, below Gibsonville, is still being pushed ahead. At a distance of three hundred feet from the shaft, a prospect hole was sunk to bedrock, a distance of nine feet, and a good prospect obtained. It is said that the company will soon put in an electric plant for lighting the mine. Parties who had the contract to run the Excelsior Tunnel at Cedar Grove, gave up the contract because the rock was too hard for the price, \$9.50 a foot.

SEIKRA CITY.—Good news has reached town this week. The Buttes mine is about to be opened. Stephen Thomas, acting superintendent of the Buttes mine, has put a force of men at work to repair the flume that supplies the mills of the company with water. This flume is about seven miles long and was badly wrecked by the heavy snows of the hard winter. There are fine prospects of the town becoming lively this summer, as it is reported that four mills are to be erected this summer, namely: at the William Tell, Sierra Buttes, Buttes Saddle and Phoenix. The Chips mine is giving promise of becoming a very valuable property at no distant day. We hear that the company has a vein of good ore five to six feet wide. We hear of a ledge of good quartz near Middle Waters, which is now being prospected.

Tuolumne.

SHIPPING ORE.—*Union Democrat*, June 20: Mr. Hank Gale and associates report their mine, situated on the Milton road below Tuttle town, as looking exceedingly well. He is now shipping ore of good paying quality to the reduction works near Sonora, to determine accurately its character and value. More study should be given by our mining men to this point.

NEVADA

Washoe District.

YELLOW JACKET.—*Enterprise*, June 20: Shipping 100 tons of gold-bearing rock daily from the lower levels and 35 tons of silver ore from the upper levels, and doing general prospecting work.

OEST.—The owners are confident that they are developing a veritable bonanza. The Taylor mill is running steadily on Oest ore.

CHALLENGE CON.—The joint Confidence and Challenge north drift on the 200 level is now in 754 feet, the face shows quartz having no value. The joint Confidence and Challenge east crosscut on the 1000 level is out 24 feet, 12 having been made during the week; the face is in porphyry.

CON. IMPERIAL.—West crosscut No. 1 from the main north drift on the 300 level is out 10 feet. The face shows quartz having no value. East crosscut No. 2 on the 500 level is now out 60 feet. The face is in quartz having no value. We are still extracting some filings and hunches of ore of fair grade.

CROWN POINT.—The south lateral drift from the winze on the 300 level is out 25 feet; the face is in porphyry, clay and low-grade quartz. Have cleaned out and repaired where necessary 170 feet of the 500 level west crosscut, and have now completed to within ten feet of the face. The 1000 level east crosscut from the south lateral drift is out 170 feet; the face is in a mixture of porphyry and clay.

BELCHER.—The west crosscut from the south drift from No. 2 crosscut, 200 level, was run 25 feet through porphyry and quartz of low grade. Have started a raise 80 feet north of the crosscut from the lateral drift, which is up 24 feet. The top is in porphyry with a little quartz in it. The north drift from the main west crosscut from the shaft was advanced 30 feet; total length, 281 feet; the face is in porphyry and low-grade quartz. The 1500 level east crosscut is out 69 feet, having been extended 14 feet; face in quartz giving low-assays.

KENTUCK CON.—Have started an east crosscut from the south lateral drift from the east raise, 1000 level. Have run through and the face is still in quartz of low grade on the average, containing spots of ore. The raise from the south lateral drift, 950 level, is up 21 feet and the top is in quartz containing stringers of pay.

JUSTICE.—Shipped 161 tons and 515 pounds of ore to the mill, worth \$18 per ton as per battery assays.

SEG. BELCHER.—On the 600 level the west crosscut from the south lateral drift is out 132 feet. The face is in soft ground composed of porphyry and clay.

SIERRA NEVADA.—Have repaired the Kenosha tunnel a distance of 200 feet. The west crosscut on the 630 level from the northwest drift, 571 feet from the shaft, is out 551 feet, 35 feet having been made the past week.

HALE & NORCROSS.—On the 1400 level they have opened a station from the north winze below that level and have started north and south lateral drifts therefrom. The joint winze in No. 5 east crosscut on our south boundary has been extended 15 feet, making its total 45 feet. The bottom is quartz and porphyry. On the 1300 level the north lateral drift

was advanced 25 feet; making total distance from the station 120 feet. The south lateral drift from the station on this level was advanced 25 feet; making a total depth of 90 feet. Face in quartz and porphyry. Are making good progress sinking the main incline; it is now 40 feet below the 1500 level.

SCORPION.—The joint north drift on the 900 level of the Union shaft was advanced 25 feet, making its total distance 144 feet from the shaft; face in soft porphyry.

SAVAGE.—Hoisted 587 cars of ore from the 500, 750, 800, 900 and 1400 levels. Shipped to the Mexican mill 530½ tons and milled 500 tons; average battery assay, \$14.58. We have bullion on hand amounting to \$14,505. The E-street tunnel has been extended 22 feet, making a total distance of 722 feet; are getting out some pay ore in this tunnel. The west drift from this station, Potosi tunnel level, has been extended 32 feet, making its total 117 feet from the shaft. On the 750 level they are extracting ore of good quality. On the 950 level the south upraise has been carried up 85 feet. They are saving some ore from this upraise. On the 1100 level the north drift from the Hale & Norcross side was advanced 16 feet. This drift continues in quartz giving some fair assays. On the 1400 level have started east crosscut No. 2 from face of the north drift; face is in quartz and porphyry. The east winze on this level is down 28 feet; bottom in low-grade quartz.

UTAH.—725 level: Have continued cutting out the winze station at a point 140 feet below this level and are doing necessary repair work in the winze, which is in swelling ground.

POTOSI.—The winze is down 159 feet below the 1400 level; the bottom shows porphyry and streaks of quartz. The south lateral drift from the incline, 1100 level, is out 228 feet; face in porphyry and streaks of quartz.

CHOLLAR.—The joint winze in the east crosscut, 1400 level, is down 65 feet; the bottom is in quartz and porphyry. Extracted and sent to the mill 519 tons of ore, worth \$20.39 per ton, as per battery samples.

BULLION.—The 1300 level (Potosi) south drift is advanced 28 feet; total from north line, 127 feet; face in porphyry.

UNION SHAFT.—West drift from the shaft, 900 level, has been advanced during the week 51 feet; total distance, 420 feet, face in porphyry.

NEW YORK.—Northwest drift, 650 level, is out 240 feet; face in porphyry. North drift, 1100 level, is out north of shaft 543 feet; formation, quartz.

WARO SHAFT.—The south lateral drift from the 1800 station is out 98 feet; face in porphyry.

SILVER HILL.—The northwest drift from the winze below the 160 level is out 7 feet; face in quartz and porphyry yielding fair assays.

ANORE.—On the 420 level, during the week, north drift from east crosscut No. 2 was extended 20 feet in quartz giving low assays. East crosscut No. 3 from main north drift was advanced 18 feet; face in quartz and porphyry.

Bernice District.

LOOKING WELL.—*Reno Gazette* June 20: W. E. Van Reed and Edward Storm, of Bernice, Churchill county, are in town. They say the Antimony mines in that district are looking fine. The gentlemen say that the district is attracting the attention of Eastern capitalists, who are trying to buy an interest. Mr. Storm has shipped since May 1st 70 tons of the ore to San Francisco, and received for it from \$60 to \$70 per ton. It costs \$25 per ton to transport the ore from the mine to San Francisco. Of this it costs \$20 per ton for transportation to the railroad, a distance of 65 miles, and \$5 per ton from Lovelock to San Francisco. That leaves about \$40 per ton for mining and profit, which speaks well for the district.

Columbus District.

A BIG CONSOLIDATION.—*Walker Lake Bulletin*, June 17: The consolidation is just announced in London of the Candelaria Waterworks & Mining Co., the Princes Mining Co., the Georgene Mining Co., of New York, and the Holmes Mining Co., Nevada. The name of the new incorporation will be the Consolidated Candelaria Co., Limited. The directors are Sir Wyndham Knatchbull, Bart., Sir Edward Hulse, Capt. Chas. W. Hulse, H. J. Hulse and Col. Wm. J. Sutherland. The Doris syndicate continues to carry a heavy share in the properties, the interests of which are now joined.

Hawthorne District.

LAPANTA.—*Walker Lake Bulletin*, June 17: During the week the incline below the tunnel has been continued, the formation larger, showing considerable iron. Stopping above the tunnel and extending the northwest drift above the tunnel. In a raise above the slope above the east drift from the bottom of No. 6 incline have encountered an independent chute of \$90 gold ore, which runs in a southeasterly direction. Twenty tons were shipped to Kincaid mill this week.

PAMLILO.—Lessees still continue to extract gold ore from the stopes at the north end of mine. Main tunnel is being driven ahead. Shipping ore to mill this week.

CENTRAL.—Sinking the incline has been discontinued for the present and the drift on 75-foot level being extended. Stopping above this level still continues. The usual amount of ore being extracted.

MOUNTAIN KING.—Main tunnel still being extended; formation softer, indicating proximity to the ledge.

HARTFORD.—Still sinking on the ledge, the ore produced being about half lead ore and half \$50 gold ore, ledge about six inches wide in bottom.

BEACON.—The stopes from the incline still producing lead and silver ore.

GOLO BAR.—The south drift, Martinez tunnel level, has been extended during the week eight feet, showing nice ledge, and on Saturday very rich ore was struck.

CONFIDENCE.—Sinking incline on vein found west of canyon, the ledge about 2½ feet wide, carrying some silver, and looking very favorable for rich ore; formation softer.

FAIRMOUNT.—Main south drift extended eight feet during the week. Have commenced to open the stope above the drift, which shows from five to eight inches of 150 ounce ore with occasional hunches of ore running 800 ounces.

CHALLENGE.—Discontinued sinking for the present; now running main tunnel ahead past old shaft, following vein, which is looking well.

NEW YORK.—A tunnel has been started to intersect the vein, and the cut and tunnel have been ex-

tended about 20 feet, and the first ledge has already been cut, showing about 10 inches wide, the same carrying very fine lead and silver ore and some gold ore. The tunnel will be extended to cut the parallel vein when it is the intention to turn south and follow the vein into the bill with a level.

IDA.—Vein continues strong and stopes producing very well.

WAR EAGLE.—Taking ore from stopes and mine looking very well.

Tuscarora District.

NEVADA QUEEN.—*Times-Review*, June 19: South drift from Commonwealth east crosscut, 4th level, extended 12 feet in the vein.

NAVAJO.—The 350 stopes are improving, the grade continues high and the ore is getting wider. Sent 52 cars of ore to the concentrator.

DEL MONTE.—2d level: Joint east intermediate drift extended 20 feet, exposing low-grade ore.

COMMONWEALTH.—1st level: Ore hoisted, 20 cars; average assay, \$35 per ton. Will commence hoisting first-class ore this week. 4th level: East crosscut advanced 12 feet. North drift from east crosscut extended and timbered 9 feet in the vein, 2½ feet of ore in the face assaying from \$22.65 to \$70 per ton.

BELLE ISLE.—The stopes continue to look well and have yielded 20 cars of rich ore and 33 cars of second-class ore. Sent to Union mill 121½ tons of ore, assay value \$35.95 per ton.

NORTH COMMONWEALTH.—1st level: In the south end of stopes have cut into some very fine ore which looks very promising for another body of ore; now in six feet.

NORTH BELLE ISLE.—The stopes above the 400-foot level are showing much better in the last few days; hoisted 3 cars first-class and 72 cars second-class ore. Sent to the concentrator 211.41 tons of ore which yielded 24.4 tons of \$167.40 assay value.

ARIZONA.

PROGRESS IN VARIOUS DISTRICTS.—*Prescott Courier*, June 19: Bradshaw district is about 40 miles south of Prescott, in Bradshaw mountains, the elevation of which is from 5000 to 8000 feet. These mountains are tolerably well watered and timbered. Principal mines now being worked are the Tiger and Crowned King. The King is very rich in gold; the Tiger, in silver. A letter from a friend of ours at the Tiger enables us to give this information: Width of ledge in raise from the 300-foot level, five feet. In it is ore that assays 200 ounces to the ton. In the drift south of station, there are 14 inches of 250-ounce ore. In north drift, from bottom of winze, there are four inches of ore that yields 1,000 ounces of silver to the ton. The drift is all in quartz, carrying high-grade metal. Not a bit of country rock in face of drift. It is scarcely necessary to say that all who are in any way connected with the mine are in good spirits. The Crowned King, a little east of the Tiger, is, as we said before, a large and rich gold vein. N. C. Shokels is managing operations at mill and mine, and doing it well. He is saving more gold, by mill process, than ever before, and making richer concentrates.

MONTANA.

PLACERS.—*Mining Journal*, June 17: The recent rains have inspired the placer miners to renewed activity. From all districts come favorable reports showing all possible advantage is being taken of the water supply. M. A. Tullock brought in 13½ ounces, the result of a seven day's run, with two men, which brought \$18 per ounce. Every available water-right is being utilized and the result will be that the placer cleanup for the season in Montana will run into the millions.

IDA MINE.—E. A. Beattie left Helena last evening wearing his mining boots, presumably enroute to the Ida mines in the Boulder valley, it being reported that a good strike has been made.

YORK GULCH.—T. H. Pratt is working the placers of York gulch, across the Missouri river, under lease from the owners, the plentiful water supply giving promise of a good cleanup.

HOMESTAKE.—Mr. Jewell has returned from a visit to the Stemple district, bringing in a substantial and satisfactory gold brick, the result of the first cleanup of the Homestake mill.

SNOW AND PLACERS.—The clouds have had another output of the placer miner's best friend, snow. Miners in from the Upper Cataract Basin district report fully a foot of snow having fallen the past three days and the end is not yet. Already the first cleanups are coming in, and the sight of an old huckskin well filled brings encouragement to the hearts of all.

NEW MEXICO.

HANOVER.—*Southwest Sentinel*, June 20: The approaching advent of the railroad into Hanover has already imparted a stimulus into that somewhat neglected camp, and now it would be difficult for the prospector to find a vacant space in the whole mineral belt available for the erection of an initial monument. When the construction of the road was first mooted mining men foresaw the possibility of realizing a small net profit over expenses on the low-grade products of the camp, when the reduction of freight comes into operation, and accordingly appropriated all the old abandoned prospect holes showing copper lead or iron. The railroad grade is completed to within two miles of the terminal point specified in the present contract. Worthen & Wake are delivering ties in compliance with their agreement, and at an early date the road will be in running order. The Neff copper mine, under the able management of I. C. Johnson, is producing large quantities of ore, and as soon as the new hoiler is fixed in place the smelter will have an abundance of ore to keep it running continuously. Mr. Neff has handed a number of iron and copper mines containing immense bodies of metal. The figures amount to quite a plethoric sum for the group and, if the sale be consummated, Jack Shanley and others will be handsomely remunerated for some years of patient toil. The zinc mines are producing as largely as ever, but the Zinc Valley mine has proved to be the great bonanza of the lot, and shows no diminishing feature in its vast ore bodies. An expert examined the great deposits of white and variegated marble a few days ago. He pronounced the quantity inexhaustible and the quality equal to the finest Italian.

List of U. S. Patents for Pacific Coast Inventors.

Reported by Dewey & Co., Pioneer Patent Solicitors for Pacific Coast.

FOR WEEK ENDING JUNE 16, 1891.

- 454,195.—VENTILATOR—P. Abrahamson, S. F.
 454,105.—TAG AND PARCEL TIE—W. H. Anderson, Riverside, Cal.
 454,199.—RIVETING MACHINE—M. Arnold, S. F.
 454,202.—SAFETY GUARD FOR SLEEPING CARS—Nathan Brown, Oakland, Cal.
 454,206.—STEAM GANG-PLOW—N. L. Darling, Benicia, Cal.
 454,033.—BURGLAR ALARM—C. C. Davis, Los Angeles, Cal.
 454,340.—FILTER—J. A. Fulton, Astoria, Or.
 454,213.—AXLE-SETTING MACHINE—G. W. Hunter, Fresno, Cal.
 454,218.—GOVERNOR—J. F. Kirby, S. F.
 454,219.—WRENCH—H. H. Love, Sacramento, Cal.
 454,220.—RULING PEN—H. H. Love, Sacramento, Cal.
 454,221.—WRITING PEN ATTACHMENT—David Lubin, Sacramento, Cal.
 454,180.—PUMP—W. McLennan, Port Angeles, Wash.
 454,225.—HARVESTER—J. & W. Paterson, Stockton, Cal.
 454,226.—WALL FIXTURE FOR ELECTRICAL CONDUCTORS—Pieper & Watson, San Jose, Cal.
 454,228.—ROCK DRILL—E. A. Rix, S. F.
 454,230.—THRASHER—E. F. Sanford, Merced, Cal.
 454,235.—CABLE RAILWAY GRIP—J. C. H. Stut, S. F.
 454,238.—ELECTRIC POLE IN GAS OR VAPOR EXPLOSIVE ENGINES—Tremper & Eisenbuth, S. F.

The following brief list, by telegraph, for June 10 will appear more complete upon receipt of mail advices: California—Ulrich Bachmann, San Francisco, fermenting vat; Willis G. Dodd, San Francisco, water-wheel bucket; Carl A. Erlandson, San Francisco, saw setting and filing machine; Henry P. Holland, assignor to J. A. Fisher, San Francisco, wave-power motor; Louis M. Howe Greenwood and L. A. Gates, assignors to H. J. Postel, San Francisco, apparatus for extracting gold and silver from ores; Frederick Lampert, San Francisco, assignor to A. J. Levanke, Tacoma, Wash., coating for piles, etc.; Benjamin Marshall, assignor to Marshall Improved Window Furniture Company, San Francisco, sash balance; Walter N. Sherman, Merced, electrical pessary. Washington—George Brown, Waltsburg, pump. Arizona—Dudley I. Craig, Silver King, adding machines.

Notes.—Copies of U. S. and Foreign patents furnished by Dewey & Co., in the shortest time possible (by mail or telegraphic order). American and Foreign patents obtained, and general patent business for Pacific Coast inventors transacted with perfect security, at reasonable rates, and in the shortest possible time.

Notices of Recent Patents.

Among the patents recently obtained through Dewey & Co.'s SCIENTIFIC PRESS U. S. and Foreign Patent Agency, the following are worthy of special mention:

WRITING-PEN ATTACHMENT.—David Lubin, Sacramento. No. 454,221. Dated June 16, 1891. This invention consists essentially, in the application to the pen of supporting or guiding arms which project downwardly beneath the pen-holder at a point sufficiently behind the nib of the pen, so that these arms will rest upon the surface of the paper and form with the pen-point a triangular support, which will relieve the wrist and fingers from strain, will hold the pen at a constant angle with the paper, and enable those who have unsteady nerves to write steadily. In writing, the point of the pen is moved over the paper in the usual manner, and the attachment or arms steady it while not presenting any obstruction to its free movement over the paper. These arms may be made rigid or slightly flexible, so as to yield under the natural pressure of the hand, and are made adjustable so that the user may set the point of the pen at any desired angle with the paper. By means of the clamp the pen may also be turned, if desired to suit the requirements of the writer.

HARVESTER.—James and William Patterson, Stockton, assignors to the Benicia Agricultural Works. No. 454,225. Dated June 16, 1891. The construction of this machine is such that, as the thrashing and cleaning machinery is supported upon and by the bearing wheels of the traction engine which propels the machine about the field and at the same time furnishes power to drive the machinery, no provision need be made for any irregularities of movement caused by traveling over uneven ground; and as the beader by which the grain is cut is hinged to the front of this rigid frame, so that the hinges are in line with the shaft by which power is transmitted from the engine to the header and the various moving parts dependent upon it, the sickle may be raised and lowered to suit the height of the grain, which is being cut, by any of the usual appliances for this purpose without in any way disturbing the connections. The whole machine may thus be supported, propelled, and operated from the single set of wheels which carry the traction engine.

SAFETY GUARD FOR SLEEPING CARS.—Nathan Brown, Oakland. No. 454,202. Dated June 16, 1891. This safety-guard for sleeping car berths is specially applicable to the upper berths for the purpose of preventing the occupants from falling out by reason of the swaying of the cars or from other causes. It consists of an adjustable webbing or net, with a means for applying it or packing it out of the way. The guard is a permanent attachment to the berth and is readily adjusted for use or rolled out of the way.

WALL FIXTURES FOR ELECTRICAL CONDUCTORS.—Oscar H. Rieper and Frank M. Watson, San Jose. No. 454,226. Dated June 16, 1891. This is a device which the inventors call a wall fixture for electrical conductors and it consists of a means for more accurately and rigidly fixing said conductors at points where they pass through plaster walls or other supports. In running electrical wires through buildings it is customary to bring the wires through the walls at such points as are necessary without regard to the proximity of a stud or other

firm support and the caps within which the electric buttons are contained are fastened by screws which often only enter plaster and the whole of the attachment is thus so loose that they frequently become detached and the wires are apt to become deranged. This wall fixture covered by the patent gives a firm support to the wires so that they are not likely to be pulled from their places or disturbed and prevents any ingress of mice or other vermin through the openings which may be made for the passage of the wires.

CABLE RAILWAY GRIP.—J. C. H. Stut, S. F. No. 454,235. Dated June 16, 1891. This cable-grip consists in certain improvements whereby the grip may be released from the cable for the purpose of stopping the car without dropping the cable, while at the same time retaining that construction which allows the cable to be dropped directly, in case of necessity, from the bottom of the grip. A grip of this kind is technically known as the "bottom" or "center grip" in distinction from that class of grips which the cable is removed from the sides of the grip, and which are known as "side-grips." This invention is designed to combine the valuable features of that class of grips known as "bottom and side grips" and to overcome the objectionable features of both these forms of grip. In what is known as the "bottom" grip the jaws open and close horizontally or nearly so, and when the cable is released it drops directly downward below the grip and but little space can be allowed for the movement of the jaws. By reason, however, of the compression upon the sides of the cable the latter is pressed into an oval section and by reason of the wear upon the dies which form the jaws of the grip, the lower edges of the dies soon become so sharp as to greatly injure the cable when the grip is slightly released from the cable while running. In what is known as the "side-grip," pressure is also applied on two sides, which flattens the cable and shortens its life. The upper vertically-moving jaw closes and uncloses upon the cable, and when it is opened for the purpose of releasing the cable the latter has the support of the lower jaw while it is traveling, but when it is to be entirely released from the grip considerable space must be allowed for the grip to move to one side for this purpose, and it is more difficult to pick up the cable after it has been released when this form of grip is used. The distance between the dies of the grip and the center line of the cable in its ordinary course on the carrier sheaves is also considerable more with these grips, because the lower die, with its support, has to clear the carrier pulleys in traveling. In this improved grip one or more jaws close upon the cable from above, and the gripping surfaces are approximately evenly spaced, so that radial pressure is brought upon the cable from three or more directions, and the cable is so nearly enclosed by the dies that it is not pressed out of shape by the strongest pressure.

ELECTRIC POLE IN GAS OR VAPOR EXPLOSIVE ENGINES.—Frank E. Tremper and John W. Eisenbuth, S. F., said Eisenbuth assignor to Electric Vapor Engine Co., same place. No. 454,238. Dated June 16, 1891. The invention consists in the novel construction and arrangement of the electrodes by which the electric spark is made for exploding the charge of gas within the cylinder. The object is to provide simple and durable electrodes for this class of engines. The electrodes are rigid bars or rods, and are more advantageous than the usual elastic or spring form which soon wear out and have their temper destroyed; but the necessary yielding of the rigid electrodes before the stroke of the piston is obtained by springs which control the sliding of the electrodes, allow them to yield and throw them back to place as soon as the pressure upon them is relieved. The manner of mounting them is simple and convenient, permitting their ready removal and insertion.

ROCK-DRILL.—Edward A. Rix, S. F. No. 454,228. Dated June 16, 1891. The invention relates to rock-drills of that class in which the drill is connected with a piston working in a cylinder under air-pressure and in which the valve mechanism is so arranged that the reciprocation of the drill will be produced automatically. The present invention has for its object an improved arrangement of valves and valve gear consisting of a main valve, a transversely moving and independent supplemental valve, with a stud engaging a cam groove upon the main piston by which it is actuated, and an exhaust valve common to the main and supplemental valves, also in a spirally grooved drill rod, a drill head having radial slant flaps, moving to these slots and engaging the teeth of a ratchet disk, and holding springs, by which the drill is rotated as it is reciprocated.

RIVETING MACHINE.—Matthew Arnold, S. F. No. 454,199. Dated June 16, 1891. This machine is used to rivet leather-belts, boot-straps and other articles, and consists of a feed chute peculiarly arranged to deliver the rivets in the proper position, a vertically moving guide and plunger by which the rivets are formed into the fabric to be riveted, a slide moving transversely to transfer the rivets to a point beneath the plunger, stops so operated as to arrest the rivets at certain points and allow them to move successively from one point to another, an upwardly moving anvil upon which the rivets are headed, a driver to deliver washers which fit the rivets and are secured by the punch and anvil, and mechanism by which these drivers are all actuated at the proper time with relation to each other to produce the required results with accuracy.

AXLE-SETTING MACHINE.—Geo. W. Hueter, Fresno. No. 454,213. Dated June 16, 1891. This invention relates generally to the class of machines for manipulating metal bars of all kinds to be bent or straightened them as may be desired and especially to those devices used for taking the bends out of vehicle axles. With this machine the axle may be adjusted without taking the axle from its connections with the vehicle. This machine has power enough to straighten any axle and an ordinary wrench or lever may be used to turn the nuts and screws. The work does not have to be bent or the axle taken off the vehicle. The whole machine is a simple and durable one for the purpose.

GOVERNOR.—John F. Kirby, S. F. No. 454,218. Dated June 16, 1891. This is one of that class of governors adapted to regulate the valves of the engine according to, and by means of, steam pressure. It consists of a cylinder communicating with the

MINING SHAREHOLDERS' DIRECTORY.

Compiled every Thursday from advertisements in this Mining and Scientific Press and other S. F. Journals

ASSESSMENTS.

COMPANY AND LOCATION.	No. AMT. LEVIED, DELINQ. AND SALE.	SECRETARY.	PLACE OF BUSINESS.
Best & Belcher M. Co., Nevada.....	49.....50c.....	June 23, July 20, Aug 18.....	L. Osborn.....309 Montgomery St.
Clara Cons M. Co., S. Dakota.....	4.....25c.....	June 23, July 20, Aug 18.....	A. Chennant.....328 Montgomery St.
Con Imperial M. Co., Nevada.....	1.....50c.....	May 6, June 11, July 1.....	O. L. McCoy.....331 Pine St.
Cose Pacific M. Co., California.....	13.....10c.....	June 1, July 11, Aug 6.....	F. E. Luty.....310 Pine St.
Gray Eagle M. Co., Nevada.....	24.....5c.....	June 2, July 14, Aug 4.....	A. W. Barrows.....303 California St.
Gonzalez & Cal M. & Co., Honduras.....	5.....\$5.00.....	May 12, June 17, July 6.....	Edward Oliver.....Montgomery Avenue
Inyo Marble Co., Nevada.....	13.....10c.....	May 20, July 10, July 29.....	G. W. Lacey.....132 California St.
Midas M. Co., California.....	2.....10c.....	April 27, June 6, June 29.....	A. Halsey.....328 Montgomery St.
Minamoth Springs M. Co., California.....	20.....50c.....	June 1, July 6, July 27.....	R. P. Mott.....Forest City
Navajo M. Co., Nevada.....	21.....30c.....	May 20, June 25, July 17.....	J. W. Few.....310 Pine St.
Northwestern L. E. M. Co., Br. Columbia.....	3.....8c.....	June 18, July 31, Aug 24.....	P. Bonardus.....438 California St.
Peer M. Co., Arizona.....	10.....10c.....	May 29, July 3, July 23.....	N. T. Messer.....309 Montgomery St.
Piedmont M. Co., Nevada.....	2.....5c.....	May 24, June 30, July 22.....	J. J. Scoville.....320 Sansome St.
Seg Belcher & Miles Cons M. Co., Nev.....	8.....25c.....	June 18, July 20, Aug 10.....	F. H. Holmes.....309 Montgomery St.
Sterling M. Co., Arizona.....	6.....20c.....	May 20, June 22, July 28.....	J. W. Few.....310 Pine St.
Sierra Nevada M. Co., Nevada.....	89.....10c.....	May 13, June 17, July 7.....	F. L. Parker.....309 Montgomery St.
Telegraph Drift M. Co., California.....	4.....6 mills.....	June 1, July 8, July 22.....	F. R. Wehe.....Dowdville
Teresa M. Co., Mexico.....	4.....10c.....	June 8, July 11, July 19.....	A. Chennant.....328 Montgomery St.
Union Cons M. Co., Nevada.....	43.....30c.....	May 11, June 17, July 23.....	A. W. Barrows.....303 California St.
Utah Cons M. Co., Nevada.....	12.....50c.....	May 6, June 20, July 30.....	A. W. Barrows.....303 Montgomery St.
Valley View M. Co., California.....	3.....5c.....	June 16, July 20, Aug 12.....	W. J. Gurlett.....308 Pine St.

MEETINGS TO BE HELD.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	MEETING.	DATE.
Best & Belcher M. Co., Nevada.....	L. Osborn.....	309 Montgomery St.....	Annual.....	July 13
Goleta M. Co., California.....	D. M. Kent.....	330 Pine St.....	Annual.....	June 29
Monteito M. Co., California.....	D. M. Kent.....	330 Pine St.....	Annual.....	June 29
Sterling M. Co., Arizona.....	D. M. Kent.....	330 Pine St.....	Annual.....	June 29
Union Cons M. Co., Nevada.....	A. W. Barrows.....	303 California St.....	Annual.....	June 29

LATEST DIVIDENDS—WITHIN THREE MONTHS.

COMPANY AND LOCATION.	SECRETARY.	OFFICE IN S. F.	AMOUNT.	PAYABLE.
Champion M. Co.....	T. Wetzel.....	320 Sansome St.....	10.....	June 15
North Banner Cons M. Co., California.....	T. J. Mitchell.....	Grass Valley.....	70.....	Apr 20
North Commonwealth M. Co., Nevada.....	J. W. Few.....	310 Pine St.....	25.....	June 17
North Star M. Co., California.....	D. A. Jennings.....	401 California St.....	50.....	Apr 8
Pacific Coast Borax Co., California.....	A. H. Clough.....	320 Montgomery St.....	1 00.....	June 10

steam pipe and baving within it a spring-controlled piston with projecting rod, a second cylinder having a spring-controlled piston and piston rod, the latter being adapted to come in contact with the piston rod of the first cylinder whereby it is moved, a suitable connection between the piston rod of the second cylinder and the engine valves, a valve aperture in the piston of said second cylinder and liquid in said cylinder to control the return of its piston.

THRASHER.—Edgar F. Stanford, Merced. No. 454,230. Dated June 16, 1891. This invention relates especially to traveling thrashers and to such thrashers as are united with heading machines and known as "combined harvesters." The chief improvement lies in a confined vertical open-ended passage directly below the grated concave. Into this passage such grain as is separated in the concave, and such as is separated on the carriers and returned, falls. A fan blower creates a blast of air, which is divided by a directing board, so that one portion of it passes above the open top of the vertical passage and across the path of the falling material thus blowing away the chaff; another portion passes directly upwardly through the passage, thereby suspending the chaff and holding it up to the action of the cross current, while the grain drops through of its own weight; a third portion passes under the passage and blows away whatever chaff may fall through with the grain. Other improvements consist in a simple means for strengthening the frame by the rods, and in the driving mechanism; which avoids all strain and can be readily taken apart for repairs.

STEAM GANG-PLOW.—N. L. Darling, Benicia, assignor to Benicia Agricultural Works. No. 454,206. Dated June 16, 1891. This steam gang plow consists essentially of a main frame with means for connecting it with a traction engine and means for connecting with said frame as many gangs of plows as it may be desired to haul. Upon the frame a roller is placed and adapted to travel freely up and down within a slotted yoke, allowing the plows, and the frame-work to move with relation to each other and accommodate themselves to variations in the surface of the ground without forcing the plows too deeply into the ground at one time or throwing them out of the ground at another. This construction is extremely important where so many gangs of plows are being hauled by the single framework and where it would be impossible to otherwise regulate all of the plows to make them do proper work.

WRENCH.—Harry H. Love, Sacramento. No. 454,219. Dated June 16, 1891. This is a socket wrench and consists of two independent bars, adapted to slide over each other, carrying one-half the socket which clamps the nut, a means for locking these plates together at any desired point, so as to form a nut socket of any size, and certain details of construction. As the wrench clamps the opposite corners of the nut, it will be manifest that the nut will not be liable to have its corners twisted off, or marred by any power that can be applied to the wrench; and as the sockets are turned at right angles with the intervening shank or handle, they may be fitted over nuts which are otherwise out of reach.

RULING-PEN.—Harry H. Love, Sacramento. No. 454,220. Dated June 16, 1891. This ruling-pen is specially applicable for the use of book-keepers. It consists of a pen having points so made that it is adapted to make either double or single lines. By the use of this pen the double lines used in book-keeping are all symmetrical, and both double and single lines can be made much more rapidly than with ordinary pens.

Our Agents.

OUR FRIENDS can do much in aid of our paper and the cause of practical knowledge and science, by assisting Agents in their labors of canvassing, by lending their influence and encouraging favors. We intend to send none but worthy men.

Geo. Wilcox—Sacramento Co.
 F. C. HOAG—San Francisco
 F. W. KNAFF—Adair Co.
 G. B. GILL—Tulare Co.
 E. L. RICHARDS—Econddo, Cal.
 FRANK S. CHAPIN—Tulare Co.
 B. F. BELT—Shasta Co.
 J. H. P. WILLIAMS—Tulare Co.
 A. S. COOLEY—Tehama Co.
 SAMUEL E. WATSON—Sonoma Co.
 HERMAN STANLEY—Mono Co.
 C. J. WAGG—San Bernardino Co.
 J. H. CROSSMAN—San Bernardino Co.
 J. G. UNDERWOOD—Solano and Yolo Cos.
 E. H. SCHAEFFER—Central California.
 F. B. LOGAN—Arizona.
 W. M. HILLBART—Oregon.
 ARTHUR M. MITCHELL—Oregon.
 N. M. NEWPORT—Oregon.

Mining Share Market.

As indicated in last week's PRESS, mining shares shaded off under cross orders. At the declining prices the pool added largely to their already heavy holdings. They will undoubtedly cause prices to sink as low as possible under a very sick looking market, so as to get if they can, more stocks; for stocks they are after, and stocks they will have, if low prices, bear points and a heavy, sick looking market will cause outside selling. In well informed stock circles it is asserted that the pool has from 75 to 90 per cent of the shares of the 26 mines that are pooled for the big deal this Fall, when prices are to go from 10 to 30 times higher than they sold at, on yesterday (Wednesday) or in other words the person who buys more and pays cash, will make from \$10 to \$30 on each and every dollar he invests; but if a buyer purchases more than he can pay for and has his broker to carry the stock on a margin, he is liable, under an inside bear raid to lose all. It is overhanging that ruins outside operators.

Never within the history of the Comstock mines was there a more favorable time to start a market. The dead-work done in the mines has been on an immense scale. They are honey-combed with drifts and crosscuts, run to open up several levels before showing up in one or more mines a large body of rich ore, with, in the others, small but rich lodes of considerable depth. This dead-work the public paid for in assessments, and tiring of the business just when the pool is ready for a large sized deal, if not a market, they have sold out at heavy losses—the pool buying. The ventilation and connections in the various mines, were over so perfect as now, while the mills for crushing ore have been overhauled and put to the very best condition for a long run. Aside from the favorable condition of the mines, the financial and general conditions throughout the United States favor a big bull campaign. The crops are large and good prices assured; the laboring classes are generally employed and are fairly prosperous; the poor grain crops in Europe assures to the United States large customers for our surplus; thereby causing all the gold sent from here and more besides, to return. The London *Statist*, which is considered the best of authority, says, that France alone will send to the United States over \$50,000,000 in gold to pay for wheat, while England and Germany will send a still larger sum. Aside from this, our large crops and increased railroad freights will enable United States railroad companies to make splendid returns; these returns will cause European speculators to buy American railway securities, and to pay for them, metallic money will have to be remitted. All this insures a plethora of money this Fall. To this must be added a certainty in the price of silver reaching about par before Congress meets. This advance will be brought about by the discussion of free coinage and the advanced stand taken in its favor by farmers through the Grange and Alliance, and the wage earners through their national organization. Everything points to a large upward movement this Fall, if not sooner.

The market opened this (Thursday) moving active and higher with, Con. Virginia the leader. Chippers and others claim that prices will go off again, and that in July the markets will be a buy for the big deal in the Fall.

Comstock mining news not only confirms last week's advice, but adds that the development in Con. Virginia, on the 1750-foot level, is much more important than heretofore claimed. It is enlarging and getting richer. In Hale & Norcross it looks as if they are opening up a veritable bonanza. In two of the Gold Hill mines that will probably be assessed soon, they are developing something of unusual importance. It is not likely the assessments will cause well informed outsiders to sell, as the pool desires.

On May 25th, the official records of the Con. Virginia office report the bullion returns for May amount to that date at \$51,185, and for this month (June) show that the bullion returns to the 24th were \$104,279, a gain so far in this month of nearly \$53,000 over the like time in May; and yet it is not certain if the company will pay a dividend in July. There are those who claim that the funds will be allowed to accumulate so the company can start in on \$1 dividends. The net surplus in June will be about \$350,000.

A suit against the West Con. Virginia officials has been commenced by a Mr. Steel, who alleges fraud and conspiracy in certain stock transactions. The parties against whom the suit is brought have been prominently identified in the fight against the mill ring, stock pool and mine mafias.

The pumps in the Gover mine, Amador county, are now operated by electric power. It costs \$5 per day as against a cost for wood alone, with steam pumping of \$20 to \$30 a day.

MECHANICAL PROGRESS

Phenomenal Friction.

As the subject of friction is one which is just now attracting much attention among mechanical engineers, the following result of some experiments recently made by Mr. J. H. Cooper Jr. of the Franklin Institute may be considered of more than mere passing interest:

When making experiments, during the month of February, 1891, with the Thurston railroad testing machine, I noticed the ease with which the axle-hox could be made to slide longitudinally upon the axle when the same was in motion.

The several hoxes tried had about 14 square inches of surface in contact with the axle; they were variously loaded, with weight from 262 pounds upward, and the axle was running at speeds varying from 160 to 400 revolutions per minute. One hox could be moved by a pressure of one ounce when the axle was running, but required 32 pounds to move it when the axle was still.

Another hox was moved by four ounces with motion, but required 40 pounds without motion of the axle. A third hox under considerable pressure could be moved readily by a pull of six ounces, but 50 pounds would not start it when the axle was still, and, indeed, on trial, all the muscular force I could apply to it by my hands, with my foot against the machine, failed to start it. A spring balance was used in these experiments, for pulling the hox in a line parallel to the axle.

Here we employ forces anywhere from 160 to 1, up to perhaps 1000 to 1, for moving the same body, under the same load and conditions, except that of the revolving or standing shaft beneath it. This phenomenon of friction proved a marvel to all who witnessed it. The temptation was great to theorize upon this extraordinary performance, but no theory was offered in explanation of it. A practical suggestion was made, however, in reference to planer-hed motions, and the like, which drag so heavily upon their fixed ways. If, as then proposed, revolving shafts were placed in the hed ways, and the table fitted to them, a pound pressure would move the table and its load back and forth on the revolving ways, where 1000 pounds or more would be required to do this work on the usual fixed V's or planers, as they are generally built. To the writer, this unique action, as if the loaded hox were floating, was an instructive object lesson in mechanics.

WHY DOES SOLID IRON FLOAT ON MOLTEN IRON?—This question, which has puzzled a good many observers, was satisfactorily explained by Dr. Anderson in a recent paper on steel read before the Iron Institute, London. When a piece of solid iron is thrown into a pot of molten iron or steel, the solid metal at first sinks, which shows that its volume is less than the melted metal. But soon the solid piece becomes heated, which causes it to expand, its volume is increased, and it rises and floats on the surface of the molten mass. The action is the same both with iron and steel. Mr. Wrightson said: "The experiment was frequently made by throwing a piece of iron into melted steel. They could see it go down, and might think that it was on account of the impetus which the iron had attained in falling that high, but as a matter of fact, if the iron had attained in falling that high, but as a matter of fact, if the iron were put upon a fork and lowered, it would go down; but in the course of a few seconds it came up again, and kept on expanding until the piece of iron was a considerable distance above the surface of the metal. Then it decreased in volume, and of course became of the same volume as the molten metal which it joined. Any one could see by the distance that the piece of iron went above the surface that it was of considerably less density than the molten metal."

WHERE THE IRON GROWS—In the city of New York there are about 500 miles of paved streets, and it is estimated that there is in constant wear upon these streets about one million tons of iron, in the shape of wheel tires, street car rails, horseshoes, etc.; not more than one-half of which ever gets back to the puddling furnace or rolling mill. Tons of iron are worn off from horseshoes every day, perhaps 20 times the amount is lost from tires of ordinary vehicles. The surface roads give off tons from the rails and car wheels; the elevated roads also lose tons from their rails and car wheels. The pedestrians grind off tons of nails in the heels of their shoes, and not an ounce of all this is saved. It becomes dust and is blown everywhere, but the great majority finds its way to the head of the ocean with street dirt and garbage, and until some great revelation shall make a radical change in ethereal matters the millions of tons of iron which are thus deposited in the wild waste of waters will not again enter into the useful arts of which they were once such an important factor.

CHECKED COMBUSTION.—"The result of checking combustion is fully as uneconomical as that of incomplete combustion. In the combustion of ordinary coal gas, as when used in the gas range, a great deal of the unconsumed gas escapes, as is shown by the odor that may be noticed in the room. In this case the combustion is checked by the flame striking

the cold surface of whatever it may be on the fire at the time. This cooling down of the gases prevents the full combination taking place, because the combination requires time as well as temperature to become fully complete. The same thing takes place in the boiler furnace where, although the gases and air may be mixed in the correct proportions for complete combustion, yet this cooling down of the gases from striking the cooler surface of the boiler checks the combustion at that point and the different gases are delivered to the atmosphere uncombined after having passed through the boiler tubes. The amount of heat-producing matter thus wasted is the most important factor in such cases, but where gas is used for cooking and lighting purposes the gases which escape are deleterious to health. This is a subject of considerable importance at the present time, when gas stoves and ranges are being so largely introduced."—*Stationary Engineer.*

IRON AND STEEL FORGINGS.—According to an invention by H. E.hardt, of Dosseldorf, Germany, hollow forgings in iron or steel are made from solid blocks of red hot or white hot iron or steel. Several examples of the process are described, from which the following are selected: To produce a hollow cylinder a piece of hot square metal is taken, the cross-section of which, diagonally measured, corresponds to the diameter of the hollow cylinder to be produced, and a pointed core bar is then driven into the metal by means of a hammer or press, the lid of the matrix forming a guide for the core bar. When desired, the matrices may be formed with jackets in which circulates a cooling medium. The metal is thus forced to fill the cylindrical matrix, and has an opening through its centre in the direction of its length. Hollow prismatic bodies may be produced in similar fashion, an important condition in all cases being that the metal to be operated upon shall be truly centred by the matrix. For hollow bodies of unusual length two core bars may be employed, entered into the metal from opposite ends. Where steam hammers or presses are used, their frames may form guides for the matrix.

A FOOTCH INVENTOR makes a solid round hand of rope, for power transmission, by imitating flat webs of canvas or other fabrics with a solution of gutta-percha, rolling it upon itself, and wrapping with cloth. A flat web is made in a similar manner by folding the fabric into layers of the desired width and passing it through pressure roll. Why, asks the *Sewing Machine News*, cannot some of those who are connected with the manufacture of sewing machine supplies take a hint from what this Scotch inventor has done, and bring out a material for sewing machine belts to take the place of the leather belt that is now in use? Could not a woven chord be so combined with gutta-percha or similar material that would produce a cheap as well as a durable belt?—*Invention.*

A FOUNDRY HINT.—When cores run through heavy bodies of iron, the hot liquid raises the feeble element of the sand to such a high temperature that the grains fuse together, so that when the casting cleaner tries to get the core out he finds it almost as hard as the iron. A good thing to prevent this fusing of the sand is to mix some sea coal or blacking in it and to give the surface of the core a good body of black lead or plumbeous blacking. The outside coat of blacking will prevent the liquid iron from eating into the surface of the core sand, and the sea coal or blacking, mixed in the sand burns away and partakes of the forms of gas, leaving a porous body between the grains of sand, which assist in preventing its fusing.—*Invention.*

INVENTION.—A Western manufacturer, whose manufactures are covered by several patents, expressed himself recently to the writer to the effect that he had never really invented anything; that he had simply combined things to his purpose, and nothing more. All of this shows a misunderstanding of what is really meant by the expression "to invent." No one can invent the sunshine, but it is possible for any one to invent uses for the sunshine, and to obtain a patent on so doing. Then he will bear a lot of criticism, because the sun shone before he was born.—*Am. Machinist.*

SCORING IN BEARINGS is likely to occur where there is no end-way movement or at least this is one of the reasons why such movement is recommended; but there are places where the least endway movement is not allowed, and places too that have all they can manage, especially where level gears are used. On long lines of shafting, where expansion causes a movement in every hanger, there must be a fine chance for some of the bearings to get a new seat almost any portion of the day.

MOULDS FOR CASTING IRON can only be made in sand. Iron or other metallic moulds chill the iron, and it does not fill well. The great heat at which iron melts will burn any other material, or will stick so as to break the mould.

FOUR FIFTHS of the engines, including locomotive engines, now working in the world, have been constructed during the last 25 years, and represent a grand total of 49,000,000 horse power.

SCIENTIFIC PROGRESS

A Cosmical Telephone.

We have already made brief reference to the attempt which Mr. Edison is making to catch the echo of sounds from the sun. He calls the device a "cosmical telephone." The "wizard" owns an iron mine in the town of Ogden, New Jersey, which consists of a bed of magnetic iron ore about a mile long and 450 feet wide, which he thinks runs down into the earth for five or six miles.

As would naturally be inferred, there is an enormous intensification of magnetic forces at that locality. Careful observations at the Kew Observatory, near London, have shown that such magnetic forces, wherever they exist, are directly influenced by the disturbances in our luminary known as sun-spots.

Mr. Edison says that at his iron mine he will have a million times the concentration of magnetic lines that there is at Kew. To record the daily variations in his own magnetic lines at Ogden, Mr. Edison is constructing his cosmical telephone.

"There are the most wonderful things going on in the sun's spots all the time," he says. "The disturbances are tremendous. Bursts of hydrogen fly out of these spots 600,000 miles long."

To construct his telephone he has surrounded the whole bed of magnetic iron with telegraph poles. On these poles he is stringing a cable of 15 copper wires. The ends of this cable run down into a little house and are connected with the ordinary receiver of a common Bell telephone. The idea is that the surrounding of this enormous bed of magnetic iron with the copper wires will make it a gigantic magnet such as is used in the receiver of the every-day telephone. Through this tremendous receiver Edison says he will be put in direct telephonic communication with the sun, only the communication will be one-sided. He thinks he can hear something of what is going on up there, but he can't do any transmitting. He believes that every disturbance resulting in sun-spots are attended with loud detonations and that they will cause a corresponding variation of the concentrated magnetic lines at Ogden, and that this variation will be at once detected in some way by the receiver of his cosmical telephone.

"Yes, sir," he says, "I shall bear them with this telephone. The next time there is a violent change in the sun's spots which disturbs the magnetic lines on earth I shall know it, and if 600,000 miles of hydrogen go chasing away from the sun I shall bear it."

The cosmical telephone is not yet completed, but scientific people other than Mr. Edison will watch with curious wonder to see what success he will achieve.

AGRICULTURAL SCIENCE—THE ORIGIN AND USES OF HUMUS.—Mr. Neel of Florida, says an exchange, is deeply interested in science applied to farming. We write this especially for his consideration. When the putrefaction of dead plants is completed, there remains a soft black mass, known as vegetable mold or humus. One hundred parts of the humus of wheat straw contains 26 parts of boric acid; the remainder is lime, peroxide of iron, phosphate of lime and carbonaceous matter. This boric acid contains carbon 47 parts, hydrogen 20 parts, oxygen 33 parts. Chemical action in the soil converts part of this into carbonic acid which is absorbed by the roots of plants as part of their food, while the phosphates, potash and other simples have their effect in dissolving the inert principles in the soil, independent of the humus, reducing the whole to plant food. Of course, when we speak of any acid or any alkali in the soil as having destructive action on mineral, animal or vegetable substances, we understand them to be in a very diluted form. We all know that acids and alkalis in their commercial forms are among the most powerful destructive agents known. The operations of nature, especially in promoting vegetable growth, are toned down to suit the tender, delicate nature of the tissues to be acted upon. In the rise and growth and in the fall and decay of vegetation there is no violence, the reduction of animal tissue and the extraction of mineral properties from soils and rocks is very gentle.

WHY SNOW IS WHITE.—The pure white luster of snow is due to the fact that all the elementary colors of light are blended together in the radiance that is thrown off from the surface of the crystals. It is quite possible to examine the individual snow crystals in such a way as to detect these several colors before they are mingled together to constitute the compound impression of whiteness upon the eye. The snow is then clothed with all the varied hues of the rainbow. The soft whiteness of the snow is also in some degree referable to the large quantity of air which is entangled amid the frozen particles. Snow is composed of a great number of minute crystals. More than a thousand distinct forms of snow crystals have been enumerated by various observers. One hundred and fifty-one were noticed during eight days in February and March, 1855, by Mr. Glaisher, which were carefully drawn, engraved and printed in a paper attached to the report of the British Meteorological Society for that year. These minute crystals and prisms reflect all the com-

posed rays of which white light consists. Sheets of snow on the ground are known to reflect beautiful pink and blue tints under certain angles of sunshine, and to fling back so much light as to be painful to the eyes by day, and to guide the traveler, in the absence of moonshine, by night.

LIGHT AND HEAT.—Light has been defined as any effect on the sense of sight—a sensation due to the mechanical effort produced upon the extension of the optic nerve, which forms the sensitive surface of the retina. Such mechanical action must have a mechanical cause, and as far as can be judged with the present knowledge the cause must consist of impacts on the retina, due to moving matter. This matter may have traveled all the way from the source of light, or it may have been set in motion in the eye by a disturbance which has traveled from the source. As far as can be conceived light must consist in the motion of particles of some kind from external objects to the eye, or in the propagation of some disturbance or wave motion in an as yet unknown medium. Heat is a property of matter known by one of six very distinct senses. Man has no definite idea as to the nature of heat—whether it is a subtle elastic fluid or a state of motion, or, possibly, some modification of matter related to action of force. The only hypothesis that at all accords with the phenomena of the materiality of heat is that it is a form of motion.—*Ex.*

A CURIOUS INSTRUMENT.—A very useful kind of instrument, according to the description given in the *Paris Genie Civil*, is the ergatoscope, designed lately by M. Trowe, and intended for the convenient and accurate examination of geological strata pierced by deep boring. The apparatus is entirely simple, consisting of a powerful electric incandescent lamp, enclosed in a cylindrical case, one of whose curved sides serves as a reflector, and the other, made of thick glass, permits the illumination of the bore hole. An elliptical mirror, set at an inclination of 45 degrees in the bottom of the case, throws its images vertically upward through the open top of the case to the observer, who examines them through a powerful telescope. It is said that the apparatus works satisfactorily to a depth of 1000 feet, and that the Portuguese Government has applied it to its expedition that is exploring the abodes of Mozambique.

AGE OF THE GLACIAL PERIOD.—In discussing the cause of the glacial period, Mr. Warren Upham discards the astronomical theory, since it seems wholly untenable in view of the geologic evidences that not many thousands of years have passed since the departure of the ice sheets. The measurement of the gorge and falls of St. Anthony, the surveys of Niagara Falls, the rates of wave cutting along the sides of Lake Michigan, the rates of filling of kettle holes, and the rate of deposition in the Connecticut valley at Northampton, Mass., all indicate that the time since the glacial period cannot exceed 10,000 years. Mr. Upham cites evidence in proof of the theory that the cause of the glacial period was great uplifts of the glacial areas, probably in conjunction with important changes in the course and volume of the warm ocean currents.—*Am. Geol.*

SUBMARINE DISCOVERY.—Divers in the harbor of ancient Syracuse have discovered a magnificent marble building, whose highest point is only three metres under the water. The building contains great stairways and colonnaded halls. It is believed that the edifice was once used as a bath or a temple.

A PHOTOGRAPHER in Pennsylvania obtained a negative of the bottom of an oil-well in which had been exploded a glycerine torpedo. The instrument was lowered 1700 feet, and illuminated with an electric flashlight, the result being a distinct picture of a curious cavity in the earth 14 feet long and 7 feet deep.

ARTIFICIAL MALACHITE.—A material closely imitating malachite is made by precipitating a solution of cupric sulphate of potassium or sodium carbonate. When the precipitate has settled and cohered, it is dried with gentle heat, and may then be cut and given a beautiful polish.

A NEW SEWING MACHINE, invented by a Mr. Jones, of Cardiff, Wales, has no shuttle or bobbin. The thread is supplied directly from two ordinary spools and sews through the assistance of a rotary looper. It is vastly more simple than any other sewing machine.

THE FUTURE OF CHEMISTRY.—The chemist will dominate coming inventions. All our fuel will presently be furnished in the form of gas. In a quarter of a century more, we shall wonder why man was ever such a fool as to carry coal into the house and burn it.

THE BAROMETER AND EARTHQUAKES.—The idea that a connection exists between an earthquake shock and the height of the barometer has been proved to be incorrect. This statement is based on the observations of 531 earthquakes recorded in Japan.

THE EARLIEST WEATHER RECORD.—The first known weather record was kept by Walter Meric for the years 1337 to 1344. A few photographic copies of the original satin manuscript, now in the Bodleian Library, have just been made.

GOOD HEALTH

The Physician as a Despot.

Without any pretense of faith in any doctor who is not regular, and without prejudice to a sincere intention of calling in a thoroughly instructed and expert practitioner whenever occasion demands, it is still permissible to smile amiably at the professional jealousy of quacks. The successful physician, with exceptions which happily are much more numerous than they were, is the most intolerant despot on earth, and we encourage him to be so. We are vaguely aware of the limitations of his knowledge. We know that he has to guess first what is the matter with us, and next what will do us good, and, that though there are facts his acquaintance with which help him to guess right, many theories that regulate his professional action are still hypothetical and may or may not be correct. We know that he has discovered that many of the methods his father used were unwise and deleterious, and that the doses his grandfather gave often hastened the result they were intended to prevent, and hindered what they were designed to induce. We know not only that he is a man, and therefore fallible, but that his professional science, like his father's and grandfather's, is progressive and is still very far from being exact. Nevertheless, when anything ails us, in spite of all we know of his limitations, we fly to him as though he were all wise, and do as nearly what he tells us to as our flesh and our pockets permit, for we believe that, erring and inadequate as he is, he knows more than we do, and that his knowledge is, on the whole, the best that is at our command.

This childlike trust in our physicians is a phenomenon which is creditable to us and to our doctors, and from which we both get benefit. Undoubtedly our physicians do us good; and indeed they ought to, even if they knew less and guessed less fortunately than they do, else were faith a much less potent virtue than it is declared to be. But it is one thing for us to flock of our own accord to the doctors, and quite another thing for those professional gentlemen to hold that we shall come to them and to no one else, and that we may neither be legitimately born nor die legally except with the concurrence of the learned faculty.—*Scribner.*

SKIN GRAFTING BY MACHINERY.—The practice of skin-grafting has become so common of late, and the pain, difficulty and slowness of taking grafts by the manual process of plucking up the skin and clipping it by scissors is so great that Dr. Mixer, of the Massachusetts General Hospital, has set himself to devising machinery to accomplish this purpose. He has succeeded in producing what is pronounced to be a wonderfully successful device, the first use of which is described substantially as follows: The patient had been etherized and had undergone an extensive surgical operation on her breast. The instrument for the removal of skin was applied to the anterior portion of the right thigh, and three strips, about an inch wide by six long, were taken off and transplanted to the exposed surface of the breast. The operation of removing the skin and transplanting it to its new quarters did not occupy more than six minutes. A very few days will suffice to restore the denuded surface of the thigh to its normal condition, leaving few traces of the reparative process, while the portion of breast removed will heal over rapidly by first intention. The thickness of skin removed does not exceed one-sixteenth of an inch. The advantages of the new over the old method of epidermic detachment are obvious. It is expeditious, the sections of shaved cuticle are much larger and of a more uniform thickness than can be obtained by the most dexterous manipulator, and the chances of successful grafting are enhanced by the fact that the skin is transplanted while the cellular elements are in their full vital activity.

HEALTH OF THE STATE.—Reports to the Board of Health from 66 towns and villages, having an aggregate population of 608,945, show a mortality during the month of June of 945, a percentage of 18.60 to the 1000 per annum. Among the causes of deaths and the number of decedents we find the following: Consumption was fatal in 140 cases, being a reduction of 24 since April. Pneumonia was the cause of death in 91, bronchitis in 21, and congestion of the lungs in 11. There were 15 deaths from diarrhoea and dysentery, 8 from cholera infantum, and 34 from other diseases of the stomach and bowels. Diphtheria caused 33 deaths, oroph 13, scarlatina 2, measles 3, and whooping-cough 8. Typho-malarial fever is accredited with 3 deaths, typhoid fever with 20, remittent and intermittent fevers 7, and cerebro spinal fever 3. Cancer caused 24, erysipelas 3, heart diseases 58, alcoholism 8, and all other causes 420.

SCIENCE IN RELATION TO INEBRIETY.—Dr. Shorthouse has been diagnosing the effect of various intoxicating liquors on different parts of the cerebellum when imbibed "not wisely but too well," and the tendency of the result of his investigations is to indicate that inebriety can be reduced to an exact science, so far as the subsequent demonstrations are concerned. Dr. Shorthouse finds that good wine and beer indirectly imbibed have the effect of making a

man fall on his side; whiskey, and especially Irish whiskey, on the face, and older and purer on his back, these disturbances of equilibrium corresponding exactly with those caused by injury to the lateral lobe and to the anterior and posterior parts of the middle lobe of the cerebellum respectively.

POISONOUS DRY GOODS.—The British Consul at Christiania, in Norway, about four months ago forwarded a letter calling the attention of the Foreign Office to the fact that, owing to the English printed fabrics containing arsenic, there had been a great decline in the quantity of such goods imported into Norway, and the British printed cloths were getting a bad reputation in consequence of their containing such a large excess of arsenic. This letter was forwarded to the Manchester Chamber of Commerce, which procured samples of the goods in question, and they were handed over to Mr. Ivan Levinstein, who had the samples examined, and they were found to contain arsenic in large quantities.

CHANCES IN MEDICINE.—A doctor says that 75 out of every 100 persons who fall into a physician's hands would get well without any help, and the majority of the remaining 25 are past all human aid and the physician gets the blame for not saving their lives.

USEFUL INFORMATION.

A PERFECTLY BLACK PAINT for brass tubes is made as follows: Take two grains of lampblack, put into any smooth, shallow dish, such as a saucer or small butter plate; add a little gold size, and thoroughly mix the two together. Just enough gold size should be used to hold the lampblack together. About three drops of such size as may be had by dipping the point of a leadpencil about half an inch into the gold size will be found right for the above quantity of lampblack. It should be added a drop at a time, however. After the lampblack and size are thoroughly mixed and worked, add 24 drops of turpentine, and again mix and work. It is then ready for use. Apply it thin with a camel's hair brush, and when it is thoroughly dry the articles will have as fine a dead black as they did when they came from the optician's hands.

MOSQUITOES.—The bill of a mosquito is a complex instrument. It has a blunt fork at the head, and is apparently grooved. Working through the groove, and projecting from the angle of the fork, is a lance of perfect form, sharpened with a fine bevel. Beside it the most perfect lance looks like a hand-saw. On either side of the lance two saws are arranged, with the points fine and sharp, and the teeth well defined and keen. The backs of these saws play against the lance. When the mosquito lights, with his peculiar hum, it thrusts its keen lance, and then enlarges the aperture with the two saws, which play beside the lance until the forked bill, with its capillary arrangement for pumping blood can be inserted. The sawing process is what grates upon the nerve of the victim, and causes him to strike wildly at the sawyer.

POSTAGE STAMPS AT LETTER BOXES.—The English Postmaster-General has given permission for an experiment to determine whether postage stamps can be supplied to the public by means of an automatic machine attached to the ordinary pillar boxes. The machine to be used is about 18 inches high and a few inches square, and it can be attached to a pillar box without difficulty. A person desiring to purchase a penny postage stamp drops a penny in the slot at the front of the machine, and a white envelope comes out at the back containing a memorandum hook with a penny postage stamp in a small slit in the cover. Such a device would be the most useful to which the "slot machine" has yet been applied.

TO CLEANSE DEAD GOLD SURFACES, dissolve 80 grammes chloride of lime, 80 grammes double carbonate of potash, and 20 grammes common salt in about 3 litres of distilled water, and set the mixture aside in bottles tightly corked. Place the article to be cleaned in a deep bowl, pour the cleansing fluid upon it until it is entirely covered, and let it soak for some time, heating it if the article is exceptionally soiled and tarnished. Wash, rinse in alcohol and dry in sawdust; it will look like new gold. The cleansing fluid must be thrown away after the operation, as it will have lost its efficacy. Javelle water produces the same effect, but it costs at least eight times as much as the preparation described.

ANOTHER LEATHER SUBSTITUTE.—The scarcity of leather is causing inventors to seek for substitutes for that important material. The latest in this direction is reported for a German inventor who is said to have devised a new substitute for leather in many of its uses. This material consists of panels of wood with wire netting between, the whole being glued together under heavy pressure. The sheets thus made are said to be very tough and pliable, and suited for making trunks and other uses that require strength.

DOVETAILED BRICKS.—Gunga Ram, executive engineer, Lahore, says *Invention*, has in-

vented a new and cheap method for constructing walls and other circular brick work, for which he has taken out a patent. The secret of the invention lies in the use of specially molded dovetailed bricks with which no mortar is required, and the bricks can easily be fitted and locked by unskilled labor. The walls would be both cheaper and stronger than those built in the ordinary way.

SHOP NOTES.

System a Necessity.

The most celebrated but not always the most extensive machine and engine works are those where a correct system is adopted and enforced through all the minor departments of the business. Messrs. Whitworth, the celebrated machine tool makers of Manchester, England, and the Brown & Sharpe Manufacturing Company of Providence, R. I., are noted for their rigid system in the manipulation of their work, and they set a good example in this respect to many other proprietors of shops in which large sums of money are continually lost from the entire want of system, order and good regulations.

System in manufacturing consists, not in having small, cramped-up, badly ventilated, dirty workshops; not in hiring "cheap help"; not in using castings and forgings which are slightly defective, rough and of doubtful material, because they come half a cent per pound cheaper; not in placing uneducated foremen over a gang of men who think they know, and often do know, more than their "boss"; not in hurrying work off half finished, half daubed over with paint, half packed; not in working tools out of line or out of true; not in giving orders to the men in place of the superintendent, foreman or head of a department; not in altering patterns without informing the draughtsmen; not in hurrying, fussing, pushing and driving men and machinery until no one knows where he stands or what to do for the best, or how to please, or what to work to, or whose orders to obey. This, and a great deal more, is not system.

The statement of what is not system will facilitate the explanation of what it consists in. The workrooms should be clean, neat and airy, if not large; the shafting and tools kept tight; the wrenches, taps, dies and reamers for shop purposes, marked and arranged in racks and returned there when done with; the benches swept down daily, and a proper provision made for the hands to wash. When a tool is broken or out of order, it should be repaired or replaced immediately. Order, cleanliness and neatness should be instilled so thoroughly that men "get used to it," and take pride in having things look neat and systematic. Attention should be paid to certain standard sizes, standard gages, standard diameters, lengths and proportions. All orders should come from the proper source, and be given to the heads of each department.

First-class help is always the best, cheapest and most reliable, and that help should be paid well and regularly. "Our prices won't admit of this," says one employer. We ask, do you turn out first-class machinery, which will wear and run well? If you do, we answer that you can always employ good help and get good prices.

Introduce system, we say, to all machine builders. It matters not what peculiarities there may be in the particular one you may adopt, but, at any rate, have system, not in theory but in practice; system which the hands dare not encroach on; rules and regulations which to break is to be highly censured. Introduce plan, method and quiet, firm, orders, which the employees will respect, and for which they will work harder; and at the end of the year, there will be so much to add to your profits, for you have a well regulated and systematic machine shop.—*American Engineer.*

DRIVING PULLEYS ON TO AN ARBOR.—A mechanic who has been driving pulleys on to an arbor wonders what makes them catch once in a while and ruck up. The two metals seem to unite, and when the arbor is finally forced out of the pulley, if it is ever forced out at all, it leaves a bunch of the two metals so hard that a file won't have any impression on it. Now, what causes the metal to harden? The trouble is that these little hard spots are in the metal to start with, and are not made so by compression. They cause the boring tool to stand off while it is passing over them, and when the arbor is driven, they are the first to take the strain, and soon gather up in front of them quite a jam to resist the further driving of the mandrel. It does not take much of a particle to make a disturbance between the surfaces when there are tool-marks and imperfections to contend with. This is better seen in removing shrunk fits; the least hard spot will gather quite a bunch in front of it. The beauty of reamed holes is that the force of the arbor is spread over a surface large enough to do all the driving that is required by friction alone, without causing abrasion on any portion of the surface. In grinding plug gauges and trying them on their rings, great care must be taken to keep them well oiled, or they will take a notion to "seize," and when they do, the more it is tried to separate them, the firmer they seem to hold.—*Ex.*

It is poor management to see one machine for half a dozen different things.

ELECTRICITY.

COAL MINING BY ELECTRICITY.—The *Free Press*, published at Nanaimo, B. C., tells us follows of how coal mining is done at the Union mines, Vancouver Island, by electricity: "A representative called on A. Dick, Government Inspector of coal mines, on his late return from an official visit to the Union Colliery at Comox. Mr. Dick then gave a description of the electric machine—the first of the kind he had seen—as wonderful and doing its work with the utmost ease and the precision of clockwork. He timed the machine while at work and found that it 'mined' 6 feet by 39 inches and 4 inches deep in five minutes. It also took five minutes from the time of finishing out until it commenced work on the next. To move it from one stall to another takes about half an hour. Mr. Dick expressed the opinion that it will greatly facilitate the mining of coal, and also that the coal will come out in a more merchantable condition. In fact Mr. Little, manager, and Mr. Russell, overseer, said the refuse from the machine was not half that by the ordinary mode of mining. D. N. Osyos, electrician of the Jeffrey Company, of Columbus, Ohio, is at present at Union placing the machinery in order and instructing the operators. Mr. John Ead is in charge of the cutting machine, having one helper, who with an engineer in charge of the dynamo, is the entire working force. The steam is supplied from the colliery boilers, Mr. Osyos says that in the long wall system of coal mining the machine can do a much greater percentage of work than in the small stall system. The machine simply does the under-mining, then the miner has to come along, drill the holes, fire the shots, and load away the coal."

AN ELECTRIC ELEVATOR.—The American Elevator Company, 15 Cortland Street, New York, is manufacturing an elevator which is run by an electric apparatus placed in the top of the elevator shaft, and which occupies a space of only four by six feet and four feet high. The machine is very simple, of comparative light weight, and as it produces no appreciable vibration, there is no obstacle to placing it aloft instead of at the bottom of the shaft, by which arrangement the pull on the car is always in a vertical line. The armature shaft of the motor is coupled direct to the worm shaft and this coupling is also a brake wheel, to which the brake is applied automatically when the current is cut off, and thus not only serves the purpose of overcoming the momentum of the armature when stopping, but also serves to hold the car stationary, if through accident at the gearing station or from any other cause, the current should be cut off. The operating rope starts, reverses or stops the car at the will of the operator. There is none of the noise and disagreeable jerking of the car which makes the belt machines and spur gear machines so objectionable. The motors are of a slow speed type, made especially for elevator service. As the motor runs only when the elevator is in actual motion, no current is used during the time the elevator is standing, and if any one will take the trouble to compute the time an average elevator is standing still, they will be surprised to find how much it exceeds the time in which the current is used. Another important point is the fact that while you have here a motor capable of developing five, ten, fifteen or twenty horse power, it actually develops only the power required at the moment.

SAFETY OF THE ELECTRIC CURRENT.—Gradually the press of the country is arriving at the conclusion that "the deadly electric current" is not so deadly after all, and that, as the *Chicago News* expressed it in a recent editorial, "a very large percentage of the accidents and deaths attributed to electricity have been due to sheer carelessness or wanton horseplay." This is a gratifying indication that the public generally is ceasing to regard electricity with that panicky fear which has characterized it in New York and some other large cities where accidents due to electric light wires have occurred. Like any other powerful manifestation of energy, electricity should always be treated with an intelligent appreciation of its tremendous latent possibilities, either for good or evil; but when this feeling is replaced by a blind and unreasoning terror, the community in which such a panic prevails is simply placing obstacles in the path of progress upon which it itself should travel.

PHOSPHORUS BY ELECTRICITY.—Phosphorus is now manufactured at Wolverhampton, England, by the aid of electricity. The process consists in decomposing the mixture of phosphoric acid, or acid phosphates and carbon, by the heat of an electric arc imbedded in the mass, and the inventors urge that the local application of heat in this form is more economical than the heating of large retorts containing the mixture in the ordinary process.

ELECTRO PNEUMATIC TUBES.—Experiments are fast bringing to a practical conclusion the proposition that mail matter may be forwarded at a speed of 120 miles an hour for short distances, and by a system of quick transfer stations, a speed of 100 miles an hour may be kept up indefinitely. The establishment of an experimental line between New York and Philadelphia seems to be an ascertained fact.



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SAN FRANCISCO:

Saturday, June 27, 1891.

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Dividend Notice—The San Francisco Savings Union.
Dividend Notice—The German Savings and Loan Society.

See Advertising Columns.

Passing Events.

This is the last number of Volume LXII of the MINING AND SCIENTIFIC PRESS, and it is proper to suggest that this is a good time for the renewal of subscriptions and the commencement of new ones.

This week a number of molders arrive from the East to work in the local foundries, and it is thought that this will make a very material change in affairs here, greatly strengthening the hands of the California foundrymen. The new members of the Brotherhood of Machinery Molders and understand the situation of the strike here.

The Cabinet is this week considering the subject of silver coinage to determine whether the coinage of standard silver dollars shall continue after July 1st. The prevailing sentiment with leading Treasury officials is, that the proposition will be adopted. New York bankers oppose further coinage.

Another California mine—the Gover in Amador county—has started its pumping works with electricity and water power in place of steam. The use of electricity for power in mining operations is gradually extending.

DENVER is to have a "Mining Congress" next September.

We Shall Be Obligated.

The publishers of the PRESS would consider it a favor for subscribers to renew their subscriptions during the coming month. Many of those whose subscriptions have expired, or are about to, would probably not inconvenience themselves but would oblige us by promptness in sending in the money. A settlement of this kind from several hundred readers is of material assistance on occasion though the amount may be small from each. The price of the PRESS is sufficiently small so it should be little trouble for our subscribers to answer this appeal.

Portland Agency.

Mr. Arthur M. Mitchell will act as agent and correspondent for this office for the present, at Portland, Oregon. He has good recommendations and will use his best efforts in behalf of the readers and patrons of the paper in our North Pacific States. Whatever assistance our friends can render him in his efforts for us will be duly appreciated.

Close of the Volume.

Volume LXII of the MINING AND SCIENTIFIC PRESS ends with the number issued this week. The PRESS is the pioneer of all the mining journals of the United States, having appeared weekly since May, 1860.

The volume contains a pretty complete history of the mining industry of the country—a history that not only includes that of camps and districts, but one of the various metallurgical processes, mechanical appliances of mining, the successes and failures of each branch, and the existing condition of the business.

The experience of all those years enables the proprietors and editors to obtain and prepare suitably the information most desired by the mining community and most to its advantage.

These appliances, both for mining and metallurgy, are described and illustrated as they come to the front, enabling the miner, millman and smelter to see the advances in his particular branch, and to keep abreast of the times. Such new processes as are being tried with any show of success are described in these columns in a manner to be intelligible to all. Our numerous correspondents also gather a mass of miscellaneous information concerning different localities as may interest the mining reader. The current news of all the districts and camps is given weekly in a condensed form so as to post people generally on the progress in various mines. The PRESS is, perhaps, equally commendable for what it has excluded from its columns, viz., puff of wild cat mining schemes.

The last page of the PRESS this week contains the index of the volume, from a glance at which may be seen the varied scope of the contents of the paper. The subjects treated, while more or less technical, are enlivened in a popular form intelligible to all. The progress of the country in its mechanical and scientific branches is chronicled in these columns; and such things as may be of value in the everyday life of the industrial and progressive classes are sought for and published from week to week.

The PRESS is a necessity to the mining and industrial public of the Pacific Coast. Those who are already among its readers should further assist it by calling the attention of others to the paper. We shall naturally be glad to increase our list of subscribers, that still further improvement may be made.

California's Mineral Resources.

A call has been issued for a State Immigration Convention to be held in this city August 24th, and delegates are to be invited from all the counties. The intention is to promote in some suitable manner the work of inducing desirable immigration to this State.

Most of the "immigration literature" which has thus far appeared deals entirely with the agricultural and horticultural possibilities of certain tracts of land. The mining industry of the State seems to have been entirely ignored. Now while the counties are selecting their delegates to this proposed convention it will be well for those who have mining ground, and few have not, to impress upon their representatives the fact that attention should be called to the mining fields. There is plenty of land in all the agricultural States, but few if any have lands that can be devoted to both agriculture and mining as is the case in California.

Our mineral field is varied and large. Not

only is California the greatest producer of gold of any of the States, but she has maintained that same position since 1849. The State also yields silver, tin, copper, quicksilver, iron, borax, coal, gypsum, manganese, asphaltum, petroleum, mica, asbestos, salt, bituminous rock, chrome, marble, building stones, graphite, and a dozen other mineral products, many of them in large quantities. It scarcely seems possible that the existence and presence of all these things should be ignored in pamphlets and papers supposed to herald the resources of the State. Yet such is the fact. They are scarcely mentioned. So many pages are required to tell about the oranges, grapes and other fruits that nothing is said of the mines or mining industry.

The representatives of the mining counties should see to it, in the coming convention, that the mineral resources receive a fair share of attention. They have not got them elsewhere as varied as we have, and they should present a powerful attraction for people who are looking for a home in a land of plenty.

A Mineral Exhibit.

The first of the great World's Fairs was that of the Crystal Palace, London, in 1851, and it was there that the first practical demonstration was made of the value of a mineralogical collection as an object lesson to the general public. "Few among the great crowds at that Industrial Exhibition who swept by the series of iron ores brought together from all parts of Great Britain by Mr. Blackwell could have prophesied that the collection of half a dozen of these somber stones would give rise within a few months to an active industry which bids fair to develop a new phase in the gigantic phenomenon of the British iron trade. An example, this, of the mutual dependence and assistance of these intercolony where geological reasoning had to point out the tract in which a given formation was to be found, mineralogical observation to discover the actual deposit, and chemical analysis to determine the value of the ore."

This quotation is from the introductory lecture to the course of mineralogy and mining in the English Government School of Mines, delivered in 1852 by the late Warrington W. Smyth, the famous geologist. The half-dozen specimens alluded to were taken by Melville Attwood (now of this city) from the newly discovered iron ore beds in the Oolite formation, he having been appointed to assist Mr. Blackwell in making a collection of North of England iron ores for the Exposition of 1851.

Prof. C. Le Neve Foster, who took the place at the head of the School of Mines left vacant by the death of Sir Warrington Smyth, in his introductory lecture, Jan. 19, 1891, speaks of the Cleveland iron district as now producing between five and six million tons annually. This is the district from which the half-dozen specimens were shown in 1851.

No better illustration than this could be given of the importance of a collection of minerals publicly exhibited. The specimens in question attracted the attention of capitalists, with the result that this immense and profitable field was developed and has continued to produce ever since.

A proper representation of the mineral possibilities of this State, before the hundreds of thousands of visitors at the World's Fair at Chicago, is sure to redound to the benefit of California. As we have suggested in a previous number of the PRESS, such collections have already been made by State officials, and more could be added, so that a magnificent display could be made. It is only to be hoped that when steps are inaugurated, we will have no quarrels as to the manner, but unite in assisting to make the mining exhibit of California a success.

The new "Factory Law" in England prohibits children under 11 years of age from working in factories. This will affect from 150,000 to 200,000 children now employed in the factory districts as half-timers.

The new Mills' building in this city will have its front for two stories made of Inyo Co. marble. The stair steps and floor tiling will be of the same material.

The California buildings at the World's Fair will occupy about two acres on one of the best sites in the grounds.

Pacific Coast Patents.

There were 19 patents granted, in the week ending June 16th, to inventors on the Pacific Coast, and of this number, 14 were obtained through the MINING AND SCIENTIFIC PRESS Patent Agency. This is the oldest established agency on this coast, and it is but natural that it should obtain and keep the bulk of the business. There is a substantial advantage in an inventor being able to explain in person to the specification writer, instead of writing letters, as is the case where Eastern agents are employed. Moreover, the inventor can read and revise his completed papers and inspect the finished drawings, so that the case can be forwarded to the Department, and embody all the inventor's ideas, without errors or omissions; and even where it is necessary to carry on the business by correspondence, it is not necessary to lose much time in the interchange of letters, and the coast inventor may revise his specification before it is sent on. He also knows where to find his solicitor if anything ever seems to go wrong, or personal explanations finally prove necessary.

On the last page of this week's PRESS is an index of all patents granted to Pacific Coast inventors for the half year ending this month. Of the large number of patents there enumerated, the largest proportion were obtained through the MINING AND SCIENTIFIC PRESS Patent Agency and most of them have been described in these columns.

Having had an experience of over a quarter of a century in the business of obtaining patents, the proprietors of this agency are enabled to save much trouble to inventors and obtain good results. They can also insure promptness and accuracy. The agency has the best technical library on the coast, with full and complete official files, all of which is available to inventors. Under these circumstances it is no wonder that Pacific Coast inventors continue to give the bulk of patent office business to the MINING AND SCIENTIFIC PRESS Patent Agency.

Timber on Mineral Land.

On May 16th (page 306), we published in the PRESS the circular letter of Commissioner Carter of the General Land Office, giving the instructions which govern in carrying into effect the sections of the General Land Act of March 3, 1891, relating to the cutting of timber on public lands. The sections only apply to Colorado, Montana, Idaho, North Dakota, Wyoming and Nevada, the Territory of Utah and District of Alaska. These instructions show that settlers, miners, farmers and other residents who have not a sufficient supply of timber on their own claims for firewood, fencing or building, or for necessary use in developing the mineral or other resources of their lands, are permitted to procure timber from the public lands for these purposes, but not for sale or use on other lands or by other persons. The law specially provides that sawmill owners, lumber-dealers and others who get timber taken from public lands are as guilty of trespass as those who actually cut it.

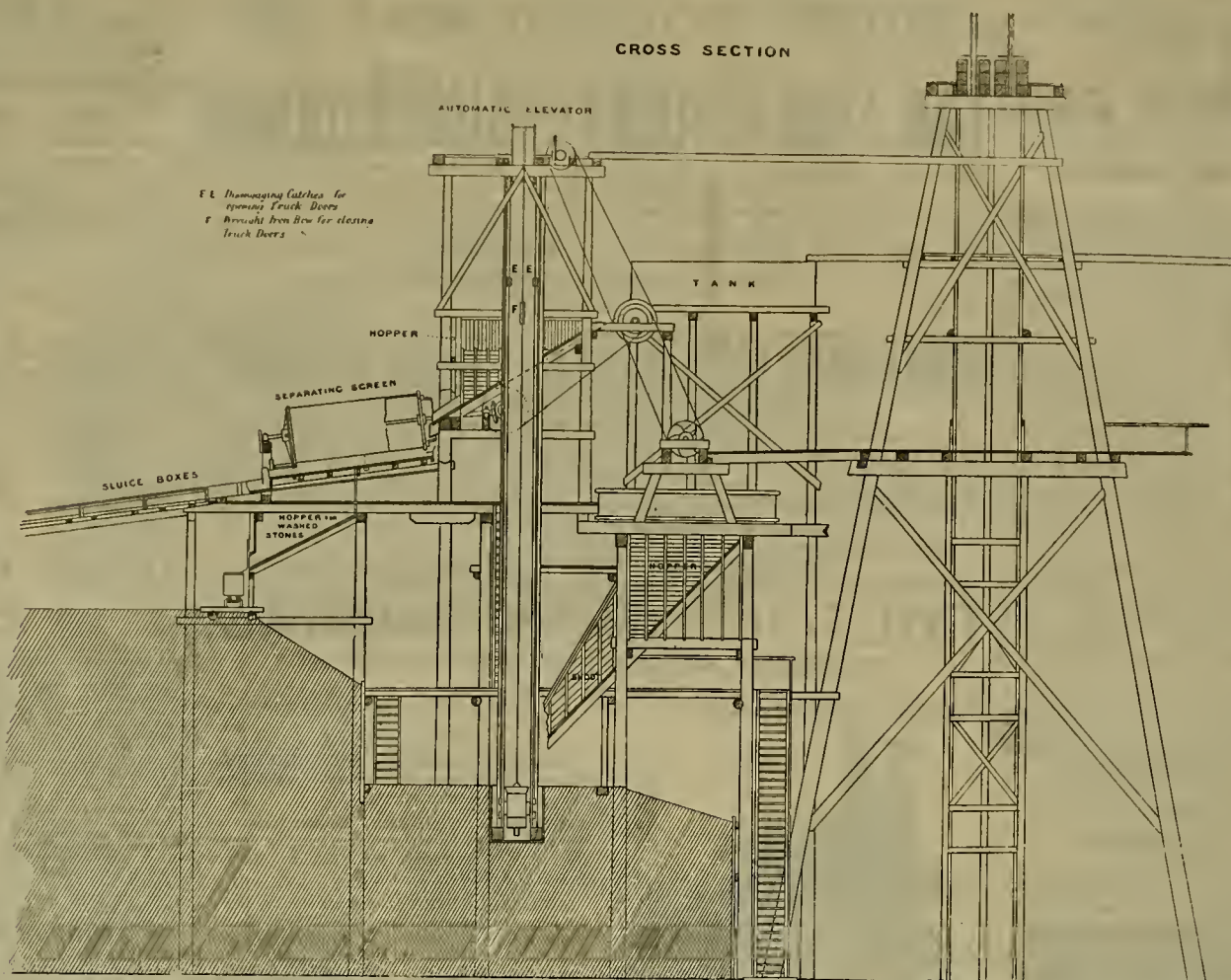
Permits may be obtained from the Secretary of the Interior to cut timber on the public lands for purposes of merchandise, under certain conditions prescribed in the Act.

A certain class of poor and ignorant wood-choppers, and also wood purchasers, are apt to get into trouble at once if this law is not complied with. Permits must be taken out at once if they are cutting timber on public lands and selling it. If a miner is using it on his own claim he needs no permit; but the Act of June 3, 1873, relative to cutting timber to sell, on the public lands, is still in force. All cases of cutting for sale in violation of the provisions of that Act in the Act of March 3, 1891, will be prosecuted.

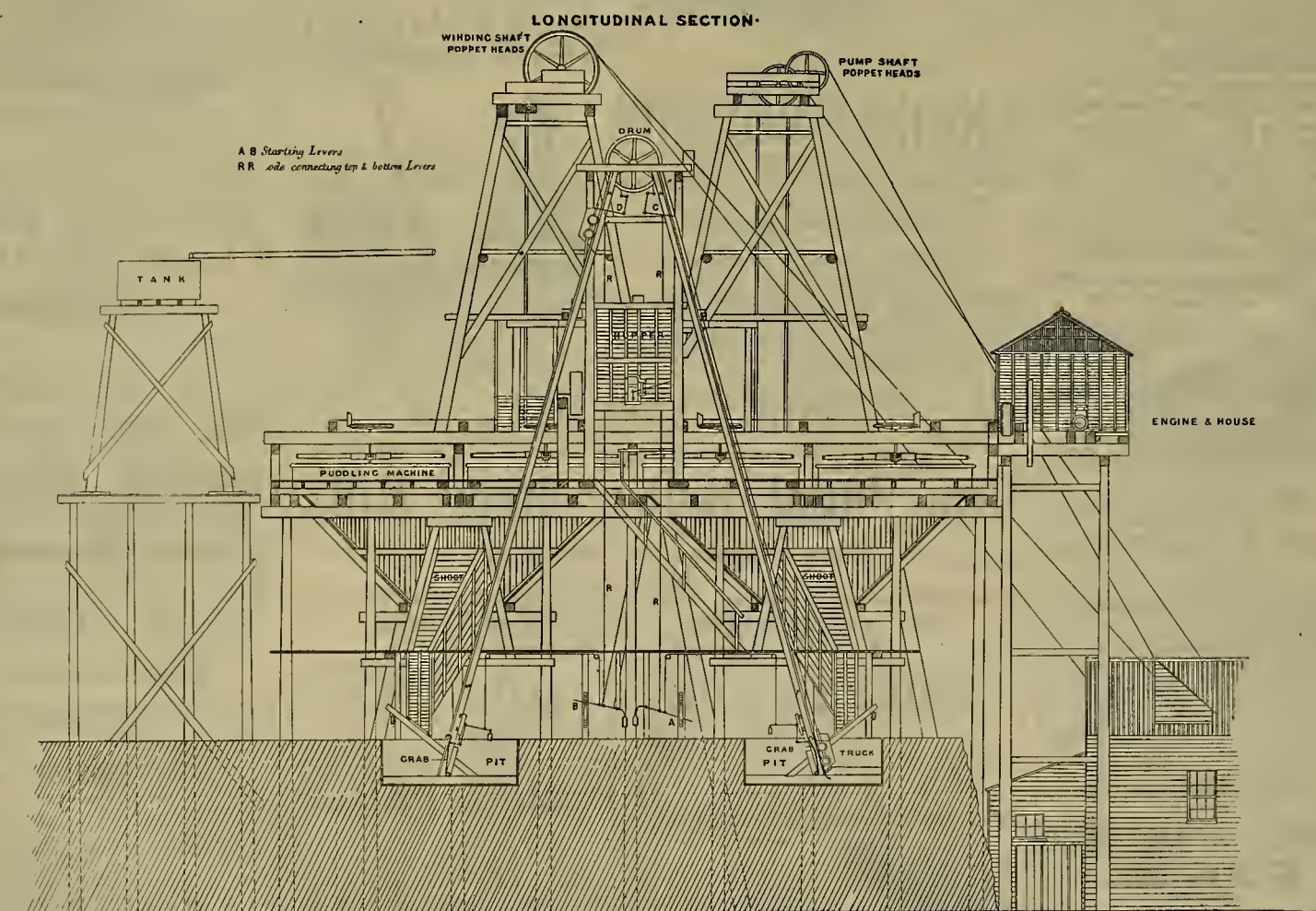
The new Act of March 3, 1891 took effect on the day of its approval, and is, of course, now in force. The fact that a wood-cutter did not know of the new law will do him no good in case of prosecution by the Government. The regulations will be enforced immediately.

C. J. EAMES of Pittsburgh offers to put up an iron and steel plant of 100 tons daily capacity in San Diego, for a subsidy of \$200,000 in mines and lands.

WORK has been resumed at the Black Diamond mines, Wash., this week, the miners having come to the terms of the company.



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AUTOMATIC ELEVATOR AND PUDDLING MACHINE FOR AURIFEROUS GRAVEL.—See Pages 402 and 403.

LEAD AND SILVER.—A number of gentlemen interested in the importation of lead ore have informed the Treasury Department of a proposition to resuscitate the smelting scheme at Vanocover, B. C., and they desire to know where the most available ores are found within the limits of the United States and near the

northwestern bonndary, and if the same may be exported and the resulting hullion brought back to this country free of dnty. Asstant Secorstory Spandling, who has been giving the matter attention, says if the resulting hullion should turn out to be silver it could come in free, but if lead a dnty must be paid.

THE ANACONDA.—L. C. Stump, agent of the Hearst estate, which is known to have an interest in the Anaconda copper mine, admits that the property has been bonded to an English corporation under the name of the Exploration Co., and that the bond will expire October 1, 1891. He denies that any sale has

yet been effected. Mr. Hagglin, the principal owner, also denies the reported sale.

R. W. GORRILL has obtained the contract for the new dam across the Tuolumne river about two miles from La Grange. The work will cost about \$350,000.

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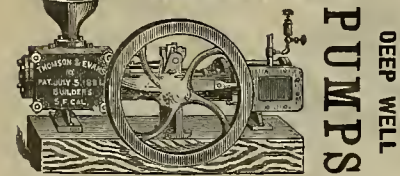
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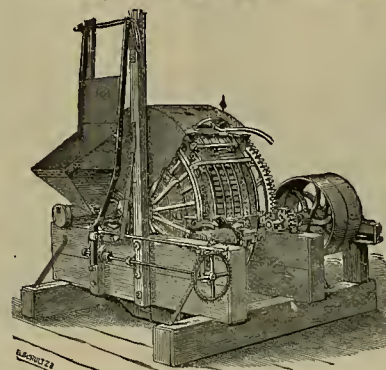
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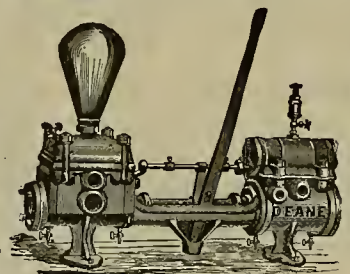
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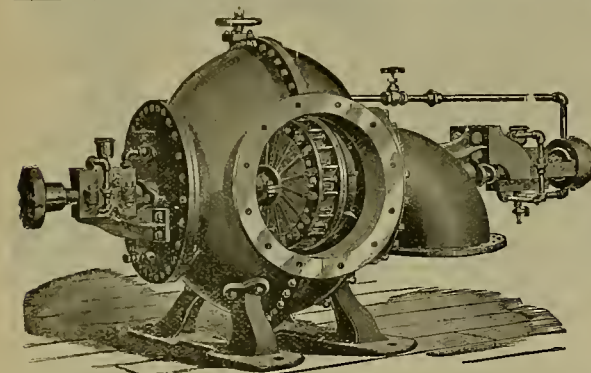
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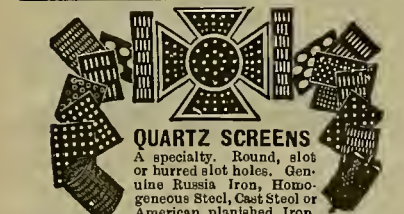
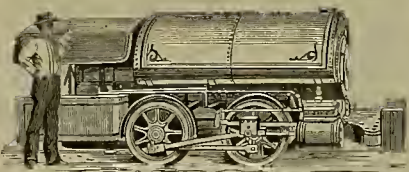
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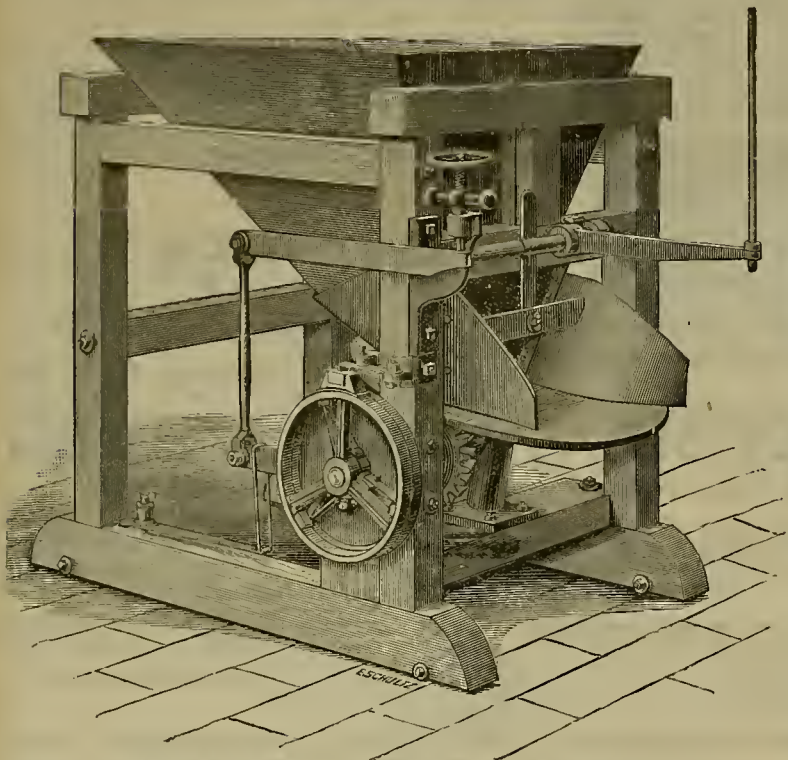
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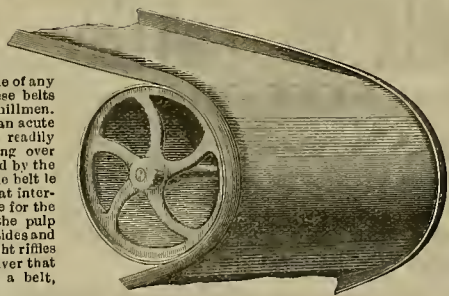
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We have now made arrangements to have our new Concentrating Belt manufactured in San Francisco; we can therefore fill all orders on short notice. The length and width of these belts are the same as is used on the Frue or Triumph Concentrating Machines, but can be made of any length or width desired. The advantages of these belts over any others will be readily seen by practical millmen. First, the flanges or edges of our belt stand at an acute angle inclining toward the center, and therefore readily conform to the change of direction while passing over the end rollers; thus the vexation and loss caused by the frequent breaking of the flanges of the old style belt is practically done away with. Again, our belts, at intervals of four feet, have a very slight rifled surface for the space of three inches, which tends to equalize the pulp on the belt, and prevents it from banking on the sides and forming channels through the center. These slight rifles also save very fine sulphurets and the quicksiver that would otherwise escape with the tailings from a belt, the surface of which is entirely smooth.



H. G. BLASDEL, Jr., Manager, 419 California St., San Francisco.

Adamantine Shoes and Dies—AND—**CHROME CAST STEEL**

Cams, Tappets, Bosses, Roll Shells and Crusher Plates.

THESE CASTINGS ARE EXTENSIVELY USED IN ALL THE MINING STATES and Territories of North and South America. Guaranteed to prove better and cheaper than any others. Orders solicited subject to above conditions. When ordering send sketch with exact dimensions. Send for Illustrated Circular.

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Special attention given to this purchase of Mine and Mill Supplies.



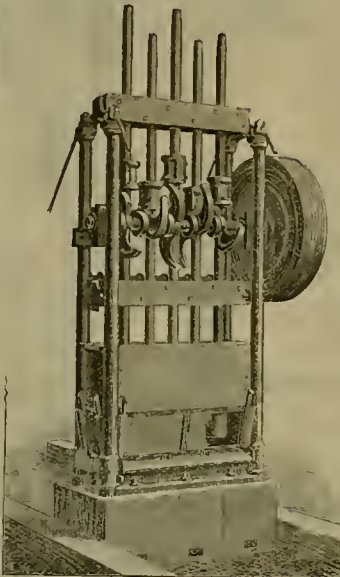
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MACHINERY FOR REDUCTION OF GOLD, SILVER, LEAD AND COPPER ORES

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Milling, Smelting or Concentration Process,
Of Most Improved Design and Construction.**SPECIALTIES:**

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Combined with Steam Shovel or Dredge.

BUCYRUS SYSTEM.

NEW METHOD OF PLACER MINING.

Saves all the Gold. Uses very little Water. Treats large quantities at Low Cost.

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BUCYRUS STEAM SHOVEL AND DREDGE COMPANY,
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Superior to all Others for Quartz Mills, Smelters, &c.

Not Affected by Wet, Steam; Heat or Oils. Every Belt Guaranteed. Try It. Send for Circular and Samples.

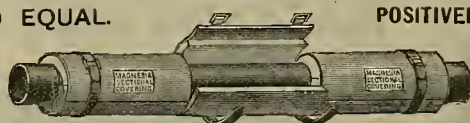
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Can Be Put On
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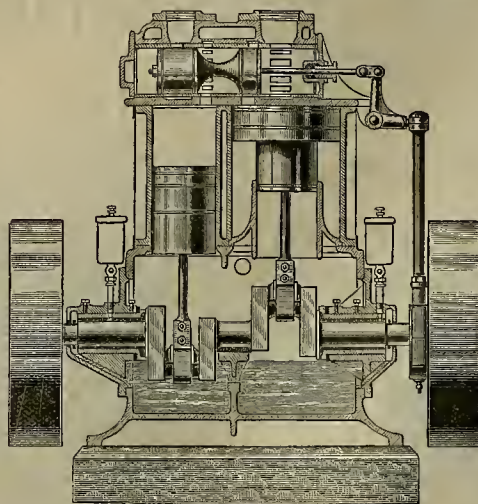
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GREATEST CAPACITY OF ANY CONCENTRATOR MADE,
One Machine Taking Pulp from 10 Stamps.



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COMPOUND, 44 ENGINES,
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SALES DURING LAST FOUR MONTHS:
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4500 HORSE POWER.

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Grand Total, 309 Engines, Aggregating 12,975 Horse Power.

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GIVES THE HIGHEST EFFICIENCY OF ANY WHEEL IN THE WORLD. OVER 1300 IN USE.

Affords the most simple and reliable power for all mining and manufacturing machinery. Adapted to heads running from 20 up to 2000 or more feet. From 20 to 30 per cent better results guaranteed than can be produced from any other wheel in the country.

ELECTRIC TRANSMISSION.

The advantages the Pelton Wheel affords in the way of a uniform and reliable power, close regulation, and the facility of adaptation to varying conditions of speed and pressure, have brought it into special prominence and extensive use for this class of work.

All applications should state amount and head of water, power required and for what purpose, with approximate length of pipe line. SEND FOR CATALOGUE.

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PELTON WATER MOTORS, Varying from the fraction of 1 up to 15 and 20-horse power, unequaled for all light-running machinery. Warranted to develop a given amount of power with one-half the water required by any other. SEND FOR MOTOR CIRCULAR. Address as above.

THE GATES ORE AND ROCK BREAKER.

UNLIMITED IN CAPACITY, UNEQUALED IN EFFICIENCY, UPWARD OF 3000 NOW IN USE.

Will do more than twice the work of any other with the same cost in wear.

Gives a fineness of product that increases the capacity of any mill from 25 to 40 per cent without any additional expense. THE BEST AND ONLY CRUSHER ADAPTED TO MACADAM ROAD WORK. Send for Circular.

THE PELTON WATER WHEEL CO., 121-123 Main Street, San Francisco, General Western Agents.



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For SAVING GOLD!

IN QUARTZ, GRAVEL, OR PLACER MINES. MADE OF BEST SOFT LAKE SUPERIOR COPPER AT REDUCED PRICES.

Our plates are guaranteed, and by actual experience are proved, the best in weight of Silver and durability. Old Mining Plates Replated, Bought, or Gold Separated. THOUSANDS OF ORDERS FILLED.

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—DEALER IN—

Assayers' and Mining Material.

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BATTERY SCREENS AND WIRE CLOTH

Agent for HOSKINS'

HYDRO-CARBON ASSAY FURNACES

IMPORTANT TO GOLD MINERS!

SILVER-PLATED AMALGAM PLATES for SAVING GOLD

In Quartz, Gravel and Placer Mining.

PRICES GREATLY REDUCED. ONLY REFINED SILVER AND BEST COPPER USED. OVER 3000 ORDERS FILLED. FIFTEEN MEDALS AWARDED. Old Mining Plates can be Replated. Old Plates Bought, or Gold Separated. These Plates can also be purchased of JOHN TAYLOR & CO., Corner First and Mission Streets, San Francisco.

SAN FRANCISCO GOLD, SILVER AND NICKEL PLATING WORKS,

E. G. DENNISTON, Proprietor.

653 & 655 MISSION ST., SAN FRANCISCO, CAL.

Our Plates have been used for 20 years. They have proved the best. We adhere strictly to contract in weight of Silver and Copper. SEND FOR CIRCULAR.



RECEIVED EVERY MEDAL
Awarded on the Pacific Coast
for Silver-Plated Amalgam
Plates and Best Gold, Silver
and Nickel Plating.

IMPROVED BELT FRUE ORE CONCENTRATOR.

The Best Ore Concentrator in the market, having double the capacity and doing its work as close as the plain Belt machine, while its concentrations are clean. It is used in a number of Mills, the most notable of which is the Alaska M. & M. Co's Mill, where 24 Improved Belt Frues are taking the Pulp from 120 Stamps, crushing 350 tons per day, and is giving entire satisfaction as against 48 plain Belt Machines, taking the Pulp from the other 120 Stamps.

Price of Improved Belt Frue Vanner, \$825, f. o. b.
Price of Plain Belt Frue Vanner, \$575, f. o. b.

For Pamphlets, Testimonials and further information apply at office.

ADAMS & CARTER, Agents FRUE VANNING MACHINE CO., Room 15, No. 132 Market Street, San Francisco, Cal.

Protected by Patents December 22, 1874; September 2, 1879; April 27, 1880; March 22, 1881; February 20, 1883; September 18, 1883; July 24, 1888. Patents applied for.

There are Over 2200 Plain Belt Machines now in Use.

THE MONTANA COMPANY (Limited), LONDON, October 8, 1885.
DEAR SIR:—Having tested three of your Frue Vanners in a competitive trial with other similar machines (Triumph), we have satisfied ourselves of the superiority of your Vanners, as is evidenced by the fact of our having ordered 20 more of your machines for immediate delivery. Yours truly, THE MONTANA COMPANY (Limited).

N. B.—Since the above was written the 20 Vanners, having been started, gave such satisfaction that 44 additional Frues and more stamps have been purchased. ADAMS & CARTER.

"TRIUMPH" ORE CONCENTRATOR WITH IMPROVED RIFFLED BELT.

The competitive trials which have been held between the "Triumph" Ore Concentrators, the "Frue" Vanners and other forms of concentrating devices, do not warrant the assertion that the "Frue" Vanner is the best ore concentrator in the market. The fact that the "Frues" have improved (corrugated) belts does not militate against the superiority of the "Triumphs;" for, when desired, they (the "Triumphs") can be mounted with a superior belt known as the "Blasdel" Riffled.

Price "Triumph" Concentrators, with Improved (Patented) Belt - - - \$650 f. o. b.
Price "Triumph" Concentrators, with Plain Belt - - - - - \$550 f. o. b.

We are prepared to guarantee the superiority of the "Triumph" over the "Frue" or any other form of Concentrator, for coin if need be. Circulars and testimonial letters furnished on application.

JOSHUA HENDY MACHINE WORKS,
39 to 51 Fremont Street, San Francisco, Cal.

(PATENTED.)
Both the "Triumph" Concentrator and "Blasdel" (riffled) Belt are protected by incontestable letters patent, granted by the Government of the United States.

Original Empire Mill and Mining Company,
Principal Office, 401 California St., cor. Sansome, S. F.
Location of Works, Grass Valley, Nevada Co., Cal.
GRASS VALLEY, NEVADA CO., CAL., Nov. 10, 1885.
JOSHUA HENDY MACHINE WORKS, 39 to 51 Fremont St., S. F., Cal.:
GENTLEMEN—I am pleased to state, in reference to the "Triumph" Ore Concentrators, that four (4) of them were placed in the mill of the Original Empire Mill and Mining Company in April, 1884, and a thorough test made of their practical operation; and their efficiency having been demonstrated, four (4) more were subsequently introduced as the complement of the Twenty (20) Stamp Mill, and the eight (8) have been and are now running with entirely satisfactory results.
At the Ten (10) Stamp Mill of the North Star Mining Company, under my supervision, four (4) are also in successful operation, and from my observation of their practical workings, I am convinced that this form of Concentrator is the equal, if not superior to any other style of Vanners or concentrating devices. DAVID MCKAY, Jr.
[Signed] Supt North Star and Original Empire Mining Co.
N. B. When the stamping capacity of the two above named mills was increased, more "Triumph" Concentrators were purchased, and twenty-eight (28) are now in constant successful operation.

LONG DISTANCE
ELECTRIC POWER TRANSMISSION.
WATER POWER

Made Available over Circuit Many Miles Long for Running TRAMWAYS, HOISTS, DRILLS, STAMPS, PUMPS, LIGHT, &c.

FOR PARTICULARS AND ESTIMATES, CALL ON OR ADDRESS
THOMSON-HOUSTON ELECTRIC CO.,
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F. A. HUNTINGTON.
— MANUFACTURER OF —
CENTRIFUGAL ROLLER QUARTZ MILLS,
Concentrators and Ore Crushers,
Mining Machinery of Every Description. Steam Engines and Shingle Machines.

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Centrifugal Roller Quartz Mill.

PERFECT PULLEYS HOISTING ENGINES FOR MINES

First Premium Awarded at Mechanics' Fair, 1884.
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MEDART PATENT WROUGHT RIM PULLEY
For the States of California, Oregon and Nevada, and the Territories of Idaho, Washington, Montana, Wyoming, Utah and Arizona. Lightest, Strongest, Cheapest and Best Balanced Pulley in the World. Also Manufacturers of
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ESTABLISHED 1868.

1, 2, or 4 Drums, with Reversible Link Motion or Pat. Improved Friction.
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96 Liberty St., New York.
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PARKE & LACY CO., Agts., San Francisco.
Send for Catalogue.

Pacific Chemical Works.
HENRY G. HANKS,
Practical and Industrial Chemist, Assayer and Geologist.
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Will report on the condition and value of any mining property on the Pacific Coast. Rare Chemicals made to order. Instructions given in Assaying and Practical Chemistry.

"RED FLAX CORD"

SQUARE FLAX PACKING.

MANUFACTURED FROM STRICTLY FIRST-CLASS FLAX AND PURE LUBRICANTS. HAS NO SUPERIOR for all Hydraulic Work.
CALICO WATER WORKS CO., CALICO, CAL., Dec. 16, 1890.
W. T. Y. SCHENCK—Dear Sir: We find your "Red-Cord" Square Flax Packing the "Boss." Yours truly, J. R. LANE, Secretary.
The red cord runs the entire length. Put up in boxes of 20 feet, or coils of 60 to 80 lbs. For sale by all dealers. W. T. Y. SCHENCK, Sole Manufacturer, 222 and 224 Market Street, San Francisco, Cal.

From January to June, 1891.

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